

SEPTEMBER 11, 1941

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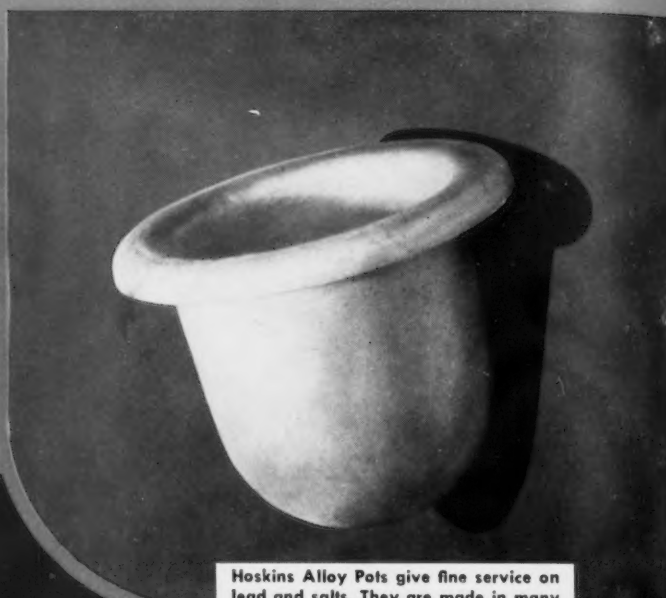
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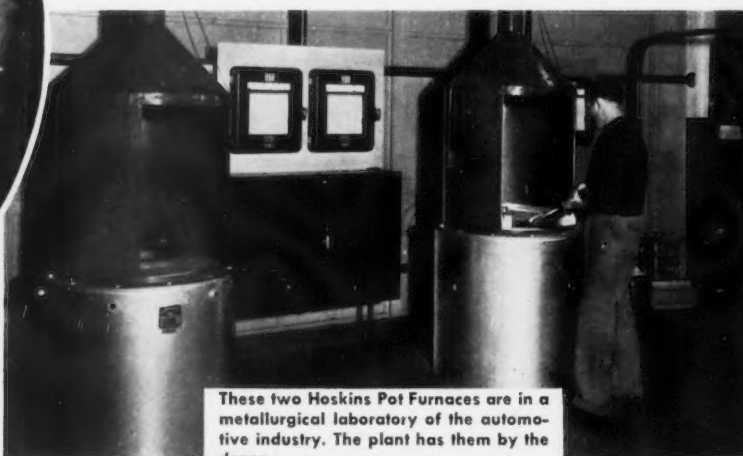
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every demand being made upon it. Later, when American industry is back to normal production, the same organization will be working just as hard to provide steels of highest quality to meet every customer's requirement, and to provide them on the immediate basis which is synonymous with the name Ryerson.

We are glad to be 99! We are grateful for the past loyalty of our customers—but more grateful, perhaps, for their cooperation now, in our effort to serve them to the full limit of our resources. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

THE IRON AGE

° °
SEPTEMBER 11, 1941

° °
ESTABLISHED 1855



"Seeing Is Believing"

MASS production took glamour away from many former handicraft industries. It called for specialization and for dividing up work into simple elements and operations. And while this provided employment and new products for many millions of people, it did something that made the making of things less interesting and much more prosaic than it had been.

That was when, in the early days of the motor car assembly lines, one began to hear a good deal on the subject of "occupational monotony."

Now monotonous repetition in working does not in itself cause discontent. The discontent comes when you cannot visualize the final product. Nothing is more monotonous than knitting socks, but this occupation today is said to be wonderfully beneficial to the nerves. Maybe it wouldn't be if the women did not know what they were knitting.

Progressive management, and time, have restored interest in the work of specialized operators. Management, by showing them just how their part fits into the final products; time by familiarizing them with these products through ownership. The man who drives nuts day after day on cylinder head studs nowadays owns a car himself and knows how important his work is to its functioning. The man who operates an oven for enameling steel sheets owns an electric refrigerator and visualizes his part in the making.

But now comes a long list of unfamiliar products; tanks and guns and bombers and so on *ad infinitum*, that the average American has never seen and knows nothing about. And he is put to work, perhaps in a plant a thousand miles removed from the assembly operations, doing something day after day without the remotest idea what his work is really for.

I think there is a constructive idea for our defense industries and for our military authorities in what happened, a few days ago, at the employees' picnic of the Lebanon Steel Foundry, at Hershey Park. The workers of this company have been and are making steel castings for the light M-3 tank made by the American Car & Foundry Co. But probably none of them had ever seen the finished product.

The company management, working through the Ordnance Department, secured one of the tanks for the occasion and put it through its paces before some 3000 in attendance. And Mr. Worrilow, president of the company, tells me that the morale building effect was tremendous.

What goes for tanks also goes for guns and bombers and all of the other strange implements of war. We know why we are making these things; why not show us what we are making?

J. W. Vandeventer

These Radiator Shell Domes Are Born Twins

AT each stroke of a 250-ton press a 35 in. x 39 in. blank is formed into an elliptical shell with axes 25 in. x 29 in. and a depth of 8 in. Formed during the same operation is a deeply embossed hood latch area 3½ in. wide, and a molding which extends around the shell near the rim. This part is made of 19 gauge cold rolled deep drawing stock.

In the next operation this formed blank is slit in half forming two radiator shell domes. The slitting die is designed to cut a strip 1 in. wide from the center of the 3½ in. hood latch area. This slitting is performed in two steps. The first cut is from one edge to the center. The shell is then turned 180 degrees for the second cut. The flashing is trimmed on a rotary shears.

Inland Cold Rolled Deep Drawing Steel is making a remarkable record in the production of these radiator shell domes.

The draw is 8 in., with heavy embossing and molding.



A 1-in. strip is cut out to separate each deep drawn part into halves.

Each elliptical shell makes two radiator shell domes.

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Steel-Cutting Carbide Tools

By GAYLORD G. THOMPSON
McKenna Metals Co.

THE author, who contributed a number of articles on carbide tool practice in 1940, has since broadened his contacts and is thus able to report on malpractice as found in industry and to recommend certain specific corrections. This article should be read in conjunction with the one by Mr. Thompson that appeared in the July 4, 1940, issue, page 25.

A FOREMAN and one of his turret lathe operators in the machine shop of a prominent machine tool manufacturer were having a devil of a time trying to find out what had become of the beautiful finish they used to get with their steel cutting carbide tools. And to make matters worse, the darn tools would not "stand up." They'd either dull too quickly or get full of cracks and just simply fall apart. That had never happened before. At least, not so consistently! "Yep—there must be something wrong with them carbide blanks. We'll send for the carbide tool engineer."

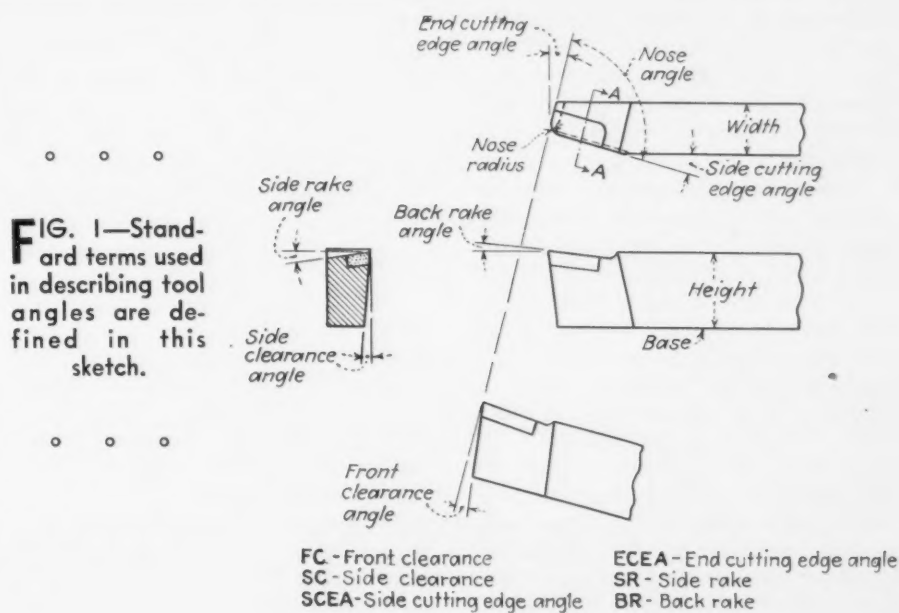
But, before telling how this particular problem was licked, it is essential that all concerned talk the same language—have a mutual understanding as to what particular point or section of the carbide tool comes to mind when the terms Back Rake, Side Rake, End Cutting Edge Angle, etc., are used. Fig. 1 is a good translator. The nomenclature is practically standard—universally understood in the machine shop. Note also the initials used

for the respective words to which they apply.

Unlike high speed steel, carbide tools cannot be used economically for alternate machining of cast iron and steel. A straight tungsten carbide tool may prove excellent for machining of cast iron but

flop very miserably if used on steel. Then, too, a carbide tool used for machining steel often requires a chip breaker groove ground along the cutting edge. A carbide tool for machining cast iron does not need it.

Except for this difference in final appearance, it is practically impossible for the grinder of carbide tools, or any one else, to distinguish by appearances the difference between a steel-cutting carbide tool and carbides used for other purposes. There is a decided difference though, in the physical construction. A straight tungsten car-



bide sintered in a hydrogen furnace and produced for the purpose of machining cast iron, will not have the right make-up for machining steel. A certain steel cutting carbide used extensively on steel jobs in the United States arsenals and shell plants consists of a compound of tungsten and titanium, etc., sintered in vacuum electric furnaces. This carbide resists

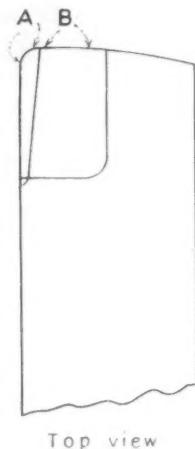


FIG. 2—This kind of a bulge on the end of a steel cutting carbide tool causes poor finish and short tool life. This sort of a shape is probably not intentional but is the result of careless tool grinding.

galling and cratering—an ideal combination for cutting steel. Both types of tools rank high in their respective fields but when they come into the grinding room the carbide tips look alike—grind alike—and feel alike, and the only way that they can be distinguished, other than by the grinding style previously applied, is by the grade letters stamped on the shank by the manufacturer. Tool shanks made on the premises and tipped should be similarly marked to avoid costly confusion.

The grinding of carbide tools for cutting steel involves a greater amount of intricacies than grinding carbide tools for cutting cast iron. The grinding angles on carbide tools for cutting cast iron can be practically the same as on high speed steel. But when it comes to grinding steel cutting carbide tools with the same angles and radii as high speed steel—you can't do it and expect the carbide tools to perform satisfactorily. It was just such a violation of this rule for grinding steel cutting carbide tools that caused the foreman to send

for the carbide tool engineer as mentioned in the opening paragraph.

In this particular case, a large turret lathe was set up for bar stock work. Heavy steel tubing 4 in. in diameter was being machined for collars. Sufficient length of stock extended out from the collet so that several collars could be machined and cut off with each chucking. The first operation after the chucking was the turning of the diameter the full length up to the face of the collet. It was this turning operation that caused the huddle between the foreman and the turret lathe operator. The finish had to be uniform—fairly smooth

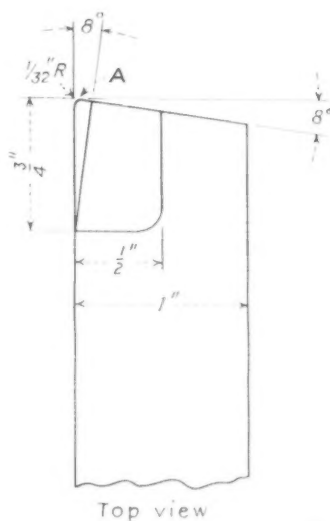


FIG. 3—Carbide tipped lathe tool properly ground for the turning of steel tubing or any machine steel shafting.

—devoid of all tool scratches and tears. This was accomplished satisfactorily in the past. As a consequence, a grinding operation was cancelled. But now that the tool started to act up, the grinding operation had to be put back in sequence until things got straightened out.

What Caused the Trouble

Fig. 2 shows a sketch of the tool that caused all the trouble. Note that long dragging cutting edge. It might be all right for a high speed tool, but it is most unsatisfactory on steel cutting carbide tools—if a good finish on the work and long life between grinds is desired. It is necessary to keep the working edge of a steel cutting carbide tool buried in the work. It should be ground so as not to let

any more of the carbide come in contact with the work than is absolutely necessary for the removal of material. A small radius on the point is necessary for smooth finish, but avoid drag.

The actual working edge of the tool in Fig. 2 is at A, while the long curve at B does more harm than good. It drags over the finished work and roughs it up. If the cutting edge is not kept buried in the steel when cutting, a lapping action is created. This lapping effect on the tool aggravates conditions more and more with each succeeding piece until finally the operator is compelled to remove the tool for sharpening. If he does not do this in time, the pushing action of the material being turned will eventually force off a portion of all of the carbide tip.

Fig. 3 shows the tool properly ground for the turning of steel tubing or any machine steel shafting. Note that the chip breaker starts from behind the nose radius. This is to avoid any possibility of the point A dragging over the work and spoiling the finish. This is a point that must be always kept in mind when grinding chip breakers on tools with more or less nose radii. Tools having a small nose radius, for example less than 1/32

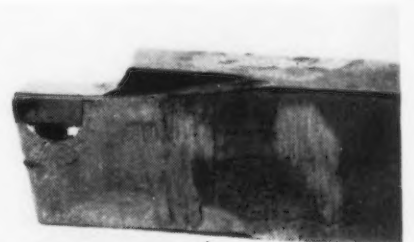


FIG. 4—On a tool having a small nose radius, a chip breaker ground parallel to the cutting edge curls the chips so that they strike against the shank of the tool underneath the carbide blank, thereby undermining and weakening the tip.

in., could have the chip breaker ground parallel with the cutting edge. However, this type of chip breaker curls the chips so that they strike against the shank of the tool underneath the carbide blank. This has the effect of wearing away the soft steel shank and undermining the carbide tip. Note the portion worn away from under the carbide tip of the tool shown in the photo-

graph, Fig. 4. Chip breakers ground at an angle as shown in Fig. 3 have a tendency to throw the chips against the rough portion of the work where they are snapped off and do no harm to the tool.

Even though the tool as shown in Fig. 3 was ground to conventional correctness and did good work, there was still some trouble with tools cracking and chipping. Other operators were having trouble with carbide tips breaking off in chunks. Tool costs soared. Machine operators were getting bawled out right and left. Bosses blamed the men and the men blamed the tools. No one tumbled to the possibility that the man who ground the carbide tools could have a part in causing all this trouble. As a matter of fact, the grinder hand was in a perpetual peeve with all those broken or damaged tools coming in to him for snagging and grinding back into their original form at reduced dimensions. Anyone who has had the experience of grinding carbide tools can readily think of easier jobs.

Faulty Grinding

But, whose fault was it that so many tools came back from the shop with chipped and fractured tips? None other than the *grinder's* of the carbide tools! It might be of interest to check into this. Investigation showed that of all the tools that were fractured, chipped, or broke easily, every one of them

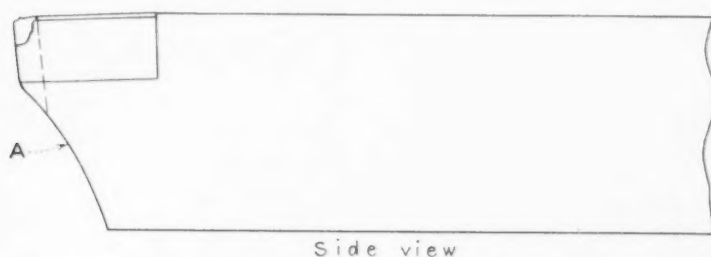


FIG. 5—In regrinding a carbide tool that is badly chipped, it is best to grind away the steel shank under the broken portion, using a wheel suitable for rough grinding steel. This leaves a minimum of grinding to be done with the soft carbide wheel.

were tools that had been ground one or more times since their receipt from the manufacturer. Plenty cause here for suspicion. Now let's see what's been going on in the grinding room.

The grinding room contained a neat arrangement of grinders of all types and kinds, all practically new, giving one the impression that the company was particular about

workmanship. Off in a corner a fellow was bearing down on some grinding work as if he was snagging castings in a foundry—a terrific contrast to the smooth and gentle operations of the surface grinders near him. The pathetic part of this fellow's efforts was that he was grinding carbide tools—and on a *dry wheel*!

Well, a grinder hand can't help that if the boss doesn't furnish a wet grinder for rough grinding carbide tools. Some day the boss will get one when he is convinced that it will save its cost very quickly by reducing tool mortality caused by grinding fractures.

The grinder hand can, however, do very good work with a dry roughing grinder provided he is patient and sticks to the fundamental rules of sharpening carbides. This fellow who was doing the snagging act wasn't. He had

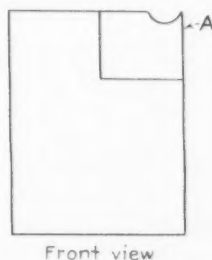


FIG. 6—How not to grind a chip breaker groove. The sharp knife edge will quickly crumble.

not free cutting. How often was the wheel dressed? Oh, whenever it got too rough or wobbly—or maybe about every three or four tools. Water—Just an old soap can holding about a cup full! This was all bad enough, but when the grinder hand took those *hot* tools over to the *wet* diamond grinder and started to finish grind those carbides—*Man! You can't do that to carbide tools and get by with it!*

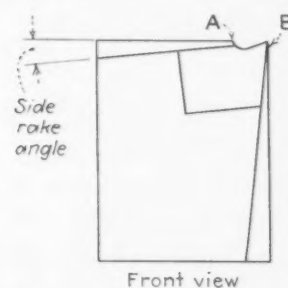


FIG. 7—The effect of side rake angle on the acuteness of the cutting edge should be taken into account when grinding a chip breaker groove in a steel cutting carbide tip.

A carbide tip has about one-half the coefficient of expansion of steel. When the steel shank of the carbide tool is ground without care, the expansion of the steel will have the tendency to pull the carbide tip apart like an accordion and create one or a number of minute fractures or cracks in the carbide. It is often impossible to see these small cracks without a magnifying glass, yet, they are there, and when the tool is put into operation, the strain of cutting usually breaks off a chunk of the carbide up to the first crack. Fortunately, there are times when the carbide tip will develop only a single heat crack at the rear of the tip. In this event, the tool will give good service until repetitive grindings bring the cutting edge close to the fracture.

A tungsten-titanium steel cutting carbide tool is composed of ingredients that are much harder than straight tungsten carbide tools, therefore, it is very important, where silicon carbide wheels are used to grind this material, that they are kept sharp. The star dresser should be used about every minute or fraction thereof during the rough grinding operations so as to expose the fresh sharp edges of silicon carbide grains. Use a moderate pressure when grinding. Feed the tool back and forth across

the entire cutting surface of the wheel. Heavy pressure does not result in faster stock removal. It breaks down the wheel more rapidly and is liable to cause disastrous overheating.

Cooling Cans Suggested

A good method of controlling excessive heat in the grinding of carbide tools on dry silicon carbide wheels is to have a set of metal containers of graduated heights, each holding a supply of water. For example: One container 3 in. high, holding 2 in. of water; another container 5 in. high, holding 4 in. of water; another container 7 in. high, holding 6 in. of water, etc. These containers could be ordinary tin cans set next to each other or built as one compact unit having compartments each holding the respective depths of water.

When a carbide tool measuring approximately 3 in. long overall is ground until warm, it can be placed on end with the carbide tip *up* in the compartment having 2 in. of water. If the tool was about 5 in. long it would be placed in the section containing 4 in. of water, etc. While the tools are cooling in the water, grinding can be performed on other tools until the cycle is completed, in which case regrinding is started on the tool that has been sufficiently cooled in the water. *Be careful, however, that water does not come in contact with the hot carbide tip.*

Chipped or broken carbide tips are usually a source of irritation to the grinder of carbide tools. Damaged tools will take from two to ten times as long to bring them to a usable sharpened condition as a tool that has merely been dulled. It's a tough job to grind away an $\frac{1}{8}$ in. or more of carbide tip and steel shank from around the broken section of the tip. When tools of this kind have to be ground, it is best to grind away the steel shank under the broken portion of the carbide tip on a wheel suitable for rough grinding steel. See A in Fig. 5. This leaves a minimum of grinding to be done on the soft silicon carbide wheel. The grinding of the carbide tip can be done much faster when there is no large area of shank steel to dull the wheel.

Diamond wheels for rough grinding are becoming recognized by many concerns as considerably cheaper per tool service than silicon

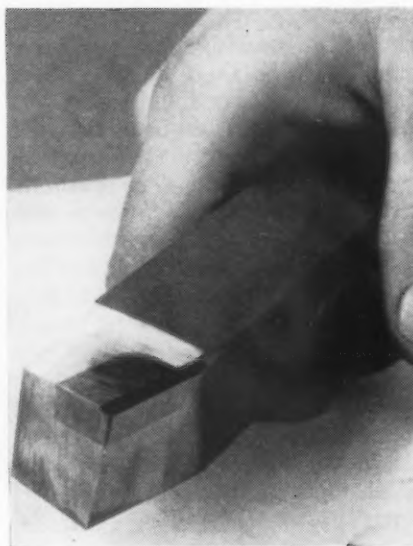


FIG. 8—A properly ground chip breaker on a steel cutting carbide tool is ground practically flat anywhere from 0.010 to 0.030 in. below the high point of the shoulder.

carbide wheels. A 100-grit diamond wheel will give excellent results in rough grinding carbide tools. A 220-grit diamond wheel makes a good finisher. Diamond wheels are used practically universally for finish grinding carbide tools after the roughing operations. Diamond wheels do not generate the heat the way silicon carbide wheels do, but this does not eliminate the necessity of coolants. You've got to carry that form of insurance against heat fractures.

Grinding Chip Breakers

One of the most annoying characteristics of sharpening steel cutting carbide tools is the chip breaker. This is invariably a controversial subject in any shop using steel cutting carbide tools. A chip breaker that suits one machinist does not suit another. The whole trouble may really lay in the fact that they both work, but on different types of steel. Where speeds, feeds and tools are the same, the physical properties of the steel may be so different that a considerable variation is experienced in chip action. Very often, where a chip breaker fails to function properly, a slight increase in the feed will produce the desired results. If the operator complains about the chip breaker not being deep enough, the grinder of carbide tools should ask the machine operator if he has tried to control the chips by feed manipulations.

The subject of chip breakers is quite an item in itself. An article on the subject appeared in *THE IRON AGE* of July 4, 1940. It is advisable for the grinder of carbide tools to familiarize himself as thoroughly as possible with at least the principles governing the grinding of chip breakers on steel cutting carbide tools.

Many machinists have the idea that a deep groove can be ground in a carbide tip to deflect chips just as it is done with high speed cutting tools. Absolutely *not*! To do so would be to create a sort of a knife edge on the tool. There isn't a carbide tool made that wouldn't crumble right off at A as shown in Fig. 6. Carbide tips do not have the elasticity or tensile strength of high speed steels, therefore, in grinding carbide tips, care must be taken that the cutting edge has plenty of supporting material around it.

Before grinding a chip breaker in a carbide tool, the grinder hand should first note the amount of the side rake angle. This is usually from 5 to 6 deg. as furnished by the manufacturer. Now, then, there is danger ahead! The grinder hand, in his effort to create a deflecting shoulder as at A in Fig. 7, will unconsciously create a knife edge as at B. This must be avoided! The side rake angle fooled the grinder. If the tip were set flat across the top so that there would be no side rake angle, it is very likely the knife edge condition as shown at B would not be so pronounced.

The photograph, Fig. 8, shows how the chip breaker should look on a carbide tool. Note that the chip breaker is ground practically flat anywhere from 0.010 to 0.030 in. below the high point of the shoulder. There'll be some good solid cutting coming from a steel cutting carbide tool with that kind of a chip breaker.

A good grinder of carbide tools is a "gem" in any plant using carbide tools. His wisdom and understanding of the peculiarities of steel cutting carbide tools is proportionately reflected in the production turned out by them.

If he uses care in grinding—doesn't overheat the tools, avoids knife-like cutting edges, and gently stones off the serrations on the cutting edge so that about 0.002 in. radius is left there—that man is contributing to production in a big way. *Watch him!*

Case Hardening à la Carte

PRACTICALLY every modern form of hardening apparatus is to be found in the heat-treating department of the Jacobs Mfg. Co., maker of small chucks at Hartford, Conn. The company recently moved into new and larger quarters in suburban Elmwood. Most of the heat treating equipment is new.

One of the unusual pieces of equipment is a continuous, reciprocating muffle furnace using the Ni-Carb process developed by A. W. Machlet of the American Gas Furnace Co. In this process, work which may have been previously pack or gas carburized and then machined is given an additional thin hard case all over which is immediately hardened by an oil quench. As the name implies, Ni-Carbing is a combination of nitriding and carburizing. It is carried out in an atmosphere of carbon-rich gas and ammonia. In this particular installation, city gas is used as the carburizing agent. Since the time cycle is very short (2 to 3 hr.) compared to nitriding, as it is ordinarily carried on in bell type furnaces (50 hr.), the case is 0.006 to 0.008 in. thick and serves the purpose of giving an extremely hard wear resisting surface on areas that would otherwise be cyanided as an additional operation to get approximately the same effect.

Although the set-up at Jacobs Mfg. Co. employs quenching from hardening heat, full hardness of the case can be obtained by cooling in the treating gas atmosphere if desired. Among the advantages of this type of surface treatment pointed out by the equipment manufacturer are that the case produced is highly resistant to corrosion and oxidation, it has tough hardness and adheres very tightly to the case with practically no tendency for exfoliation. Distortion

Pack and oil vapor carburizing, combination gas carburizing and nitriding, salt bath carburizing and induction hardening, as well as more conventional hardening and tempering methods, are being carried on by the manufacturers of Jacobs chucks.

o o o

of the work is at a minimum, especially where parts are cooled in the treating gas atmosphere. The Ni-Carb process can be used on practically any grade of steel, not necessarily an aluminum alloy nitriding type, and can be applied to steel castings, cast iron and malleable iron. At Jacobs Mfg. Co. it is applied almost entirely to alloy steel bar stock like SAE 4615, 3140, 1315 and 1340.

One of the reasons why this equipment was selected in place of cyaniding, the method previously employed, was that it eliminated the difficult cleaning job, particularly on threaded parts like chuck jaws and chuck nuts.

The process is applicable to practically all work going through the heat treating department, since the time cycle can be made short or long. With a short cycle, the furnace serves simply as a controlled atmosphere type for clean hardening and to overcome decarburization. The fact that the atmosphere is rich in carbon, obviously prevents decarburization during the heating period.

Some of the chuck parts sent through this furnace include some, but not all, chuck bodies, and all sleeves, nuts, jaws and keys (bevel gear wrenches). The sleeves have a number of vertical grooves or serrations on the outside and are afterwards ground on the o.d., leaving slight discoloration in the grooves, which adds rather than detracts from the appearance.

The furnace itself, Fig. 1, is a reciprocating hearth full muffle type, made by the American Gas Furnace Co. The hearth or muffle extends the full length of the furnace and is suspended from hangers so that it can be reciprocated back and forth. A motor driven cam retracts the muffle against spring pressure which rapidly propels the muffle forward at the drop in the cam. The hearth is stopped by an anvil on top of the bumper framework and the work moves forward under its own momentum. Thus the work pieces advance through the muffle step by step. At the entering end of muffle, a flame curtain holds the muffle gases inside and prevents air from entering. At the discharge end, a special sealing arrangement is provided between the moving muffle and the stationary discharge chute to the oil quench.

The quenching tank extends under the heating machine, and as work drops off the end of the muffle inside an enclosed chute, it is sprayed by a cascade of oil to prevent uneven splashing as it falls into the tank. A mesh belt conveyor, 24 in. wide, driven by a variable-speed unit draws the work out of the tank and deposits it in a basket. The combined units will handle about 150 to 300 lb. of work per hr. The time cycle is controlled by a variable-speed drive unit for the muffle reciprocating cam.

Gas burners fire both above and below the muffle. Temperatures are



FIG. 2—Unloading a gas carburizing furnace and placing the work baskets in a slow-cool container (left) at the Jacobs Mfg. Co. plant.

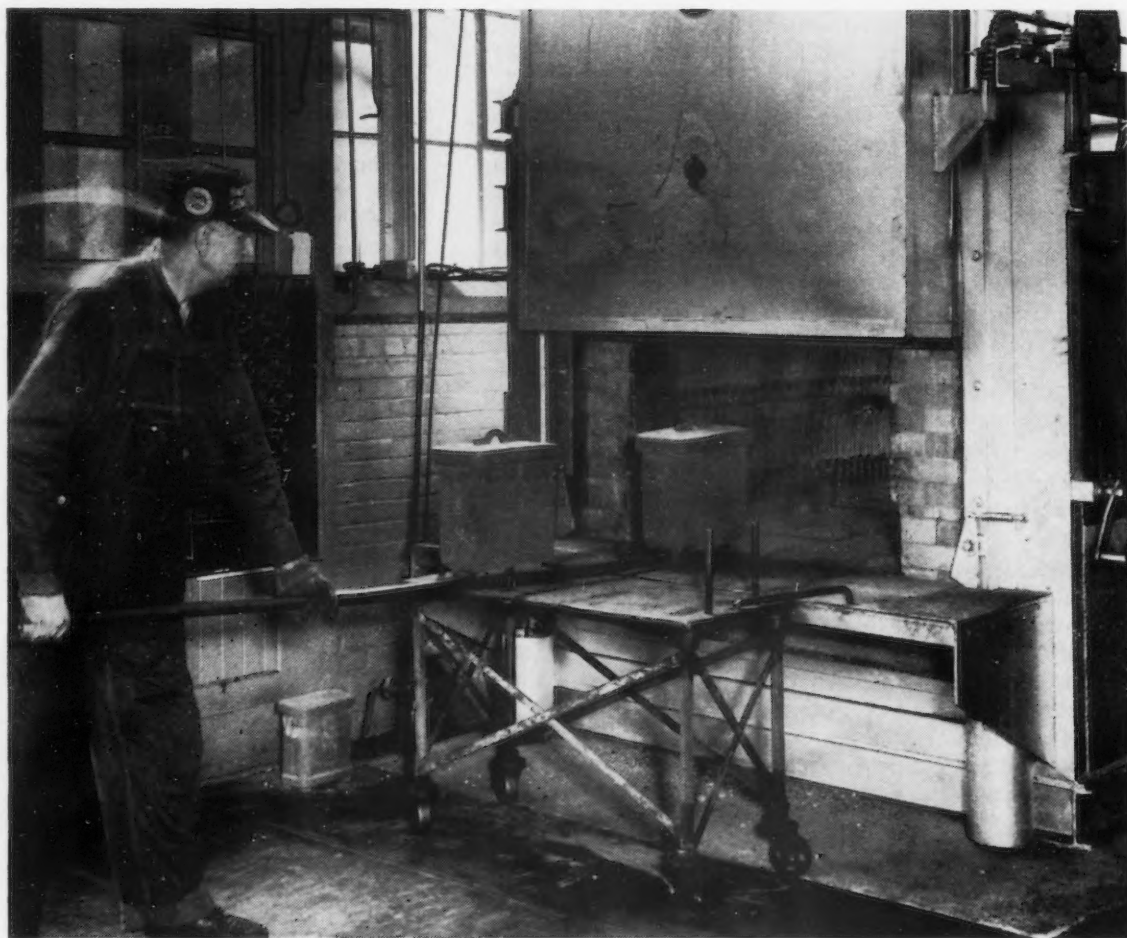


FIG. 3—Pulling pack carburizing boxes out of an electric furnace onto a cast-iron truck, which is linked to the furnace apron during the unloading operation. Truck is pushed through door at left to cool outside under protective roof.

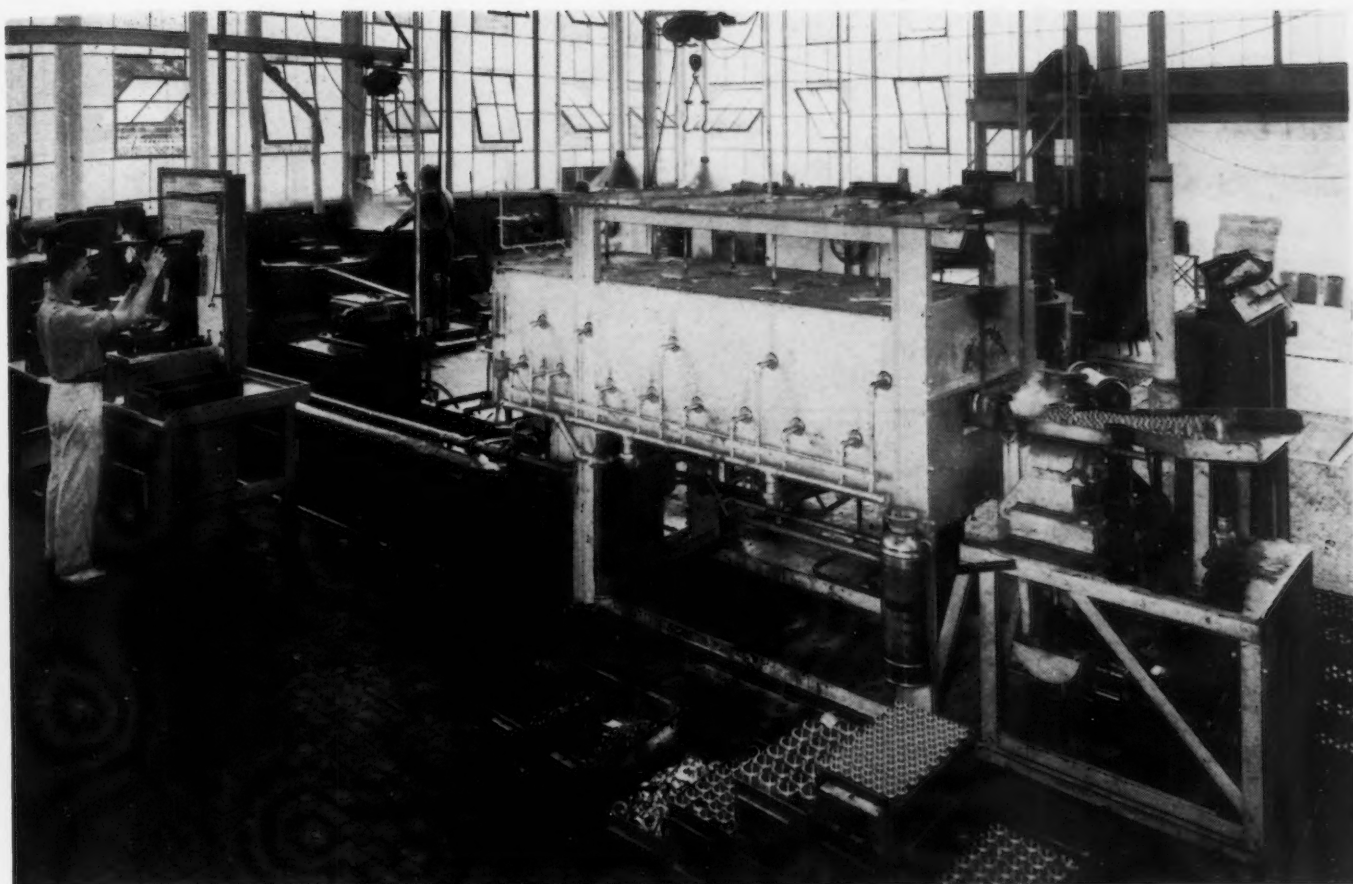


FIG. 1—View of reciprocating full length muffle and quench tank for Ni-Carbing and hardening previously carburized chuck parts. Tote boxes in the foreground hold typical parts sent through this continuous furnace which has a gas curtain at the charging end. A percentage of the products is checked for hardness on the Rockwell tester at the left. Furnace control apparatus, air blower, gas pump and ammonia tanks are on the far side of the furnace.

controlled automatically by a single valve in the air supply only, the gas pressure remaining fixed. Air is supplied by a Spencer turbine blower and city gas at 10 to 15 lb. per sq. in. by a booster pump. Ammonia gas is supplied by two cylinders feeding a single manifold and the rate of ammonia absorption is governed by dissociation apparatus located at the side of the furnace.

Pack carburizing is a preliminary operation performed on chuck parts like jaws, nuts and some sleeves in a 72-kw. General Electric furnace, shown in Fig. 2. Pots are loaded and later cooled out on the "back porch," which is an open area along the wall covered with a canopy roof. This keeps a lot of heat out of the shop in summer and gives pleasant working conditions as the porch faces a graded lawn at the back of the plant.

Chuck bodies prior to Ni-Carbing are first gas carburized to normal depth in a 72-kw. Homo-Carb furnace shown being unloaded in Fig. 3. Oil vapor is the carburizing medium. Slow cooling from the

carburizing heat is done in an insulated container shown at the left in the photograph. Work remains in here 4 to 8 hr. before being allowed to cool more rapidly to room temperature. Work containers, stacked in groups of four, are handled in and out of the furnace and slow cooler by a $\frac{1}{2}$ -ton Yale mono-rail hoist which is moved along the I-beam rail by hand rope pull at either end. In engaging the crane hook bale over the container lifts, the operator wears a conventional welding helmet with plain glass window to keep radiated furnace heat from his face.

Carburizing is also done in molten baths in equipment ordinarily used for cyaniding. Holden Light Case 200 is typical of the carbon-rich salts used in these baths.

Drawing for core toughening and stress relieving is done in either a 13-kw. Homo draw furnace or a 12-kw. Lindberg furnace of similar proportions. Work is cleaned in a soda type cleaner in a modified degreaser after it is tempered.

One of the most interesting jobs done in this plant is the induction hardening of the noses of the chuck body. There are three round key-holes radially disposed in the nose of these chuck bodies and the object is to harden the outer or wearing surface of the nose and key-holes without hardening the chuck body below the surface. Formerly, the whole nose end of the chuck body was heated in a lead bath. With this method, however, it was impossible to prevent heating and distortion of the jaw sockets in the center of the nose—an area not subjected to wear or requiring heat treatment.

Under the present arrangement, the wearing surfaces are induction hardened with a Tocco Jr. hardener. Control of heat and quenching jets is maintained within such precise limits that the hardened surface area is held to within $\frac{1}{32}$ in. of the desired width. Distortion, which previously caused rejections, has been entirely eliminated and a harder and stronger wearing surface is obtained.

Rectifiers for Electro

THIRTY-SEVENTH in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

DURING the past few years, the plating industry has witnessed the first fundamental change in equipment for supplying current since the development of the low voltage generator by Woolrich in Birmingham, England, in 1844. Although it has been used for many years for other purposes, it is only during the last decade that the rectifier has come into commercial use in electroplating operations, and that manufacturers who require a source of low voltage direct current for electrochemical processes have a choice of two types of equipment: the motor-generator set and the rectifier.

It is interesting to note that the copper oxide rectifier and the selenium rectifier were both applied to electroplating abroad, before coming into such use in the United States. The copper oxide rectifier was first put into commercial operation for electroplating in England about 1932; the selenium rectifier was developed by an International Telephone and Telegraph subsidiary in Germany about 1929, and spread all over Europe. The magnesium-copper sulphide rectifier was developed over 15 years ago; it was probably the first rectifier to be applied to electroplating in the United States on a commercial scale.

Fundamentals of Rectifiers

Rectification or the conversion of alternating current into direct current, is a process of long standing, having been in wide use for many years. It may be effected by several

different devices, such as the following:

- (1) Vibrating reed
- (2) Mercury arc
- (3) Hot cathode or Keno-tron tube
- (4) Electrolytic rectifier
- (5) Contact rectifier

The principle of rectification lies in the free passage of alternating current in one direction, while in the other direction, the resistance is enormously high and very little current is permitted to flow. Consequently, the alternating current passing through the rectifier is changed to direct current by the action of the rectifier, which "picks

off" the tops of the waves in one direction, thereby forming a flow of current in one direction.

Explanations for this action are many and varied. The theories of rectifier action mentioned by Clark and Roach¹ include: high polarization potential; unsymmetrical Becquerel effect; the occurrence of polarization at discontinuities in the interior of the solid material; thermal effects; lattice loosening, brought about by a concentration of electric energy about the point or layer of contact of one of the electrodes; a blocking layer consisting of a high-resistance material at one of the rectifier layer interfaces; the difference in electron energy bands in the semiconductor and metallic electrode, and the transfer of electrons from the metal to the semiconductor by the tunnel effect through the barrier layer; a mechanism in which the electrons are thermally excited over the barrier, rather than through it.

In practice the ratio of resistance to current flow in the two direc-

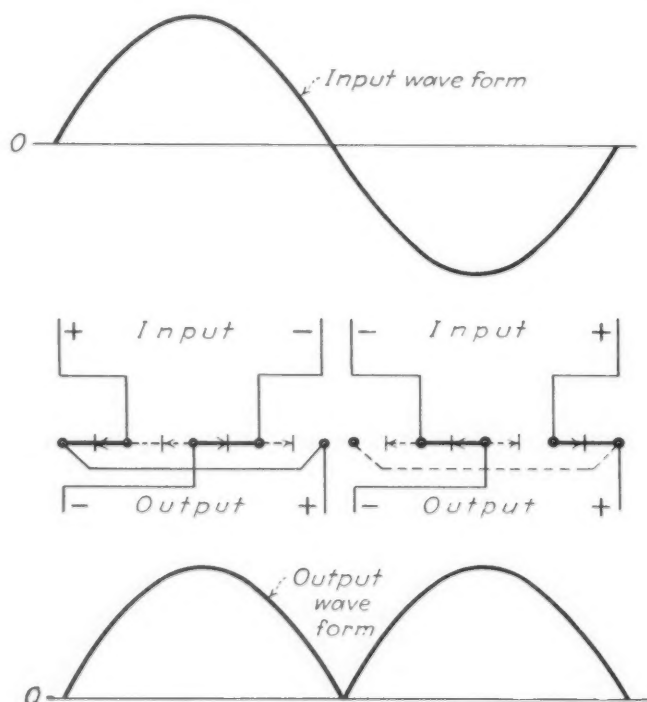


FIG. 1 — Input and output currents of a rectifier, single phase.

(From *Electroplating*, by Field and Weill.)

ro plating

By ADOLPH BREGMAN
Consulting Engineer, New York

—What are the advantages and characteristics of rectifiers, the types and makes of equipment available, and recommended operating technique? All these questions are answered in this authoritative article.

tions may be of the order of 10,000 to 1, although in the laboratory, units have been made with ratios as high as 60,000 to 1.²

A single rectifier element would give "half-wave" rectification; when the polarity of the alternating current supply is in one direction, current passes through the rectifier; when the polarity is reversed, no current flows. The circuit to which the rectifier is connected, therefore, experiences successive pulsations of unidirectional current, which will flow for only half the time with intervals of practically no current

flow when the alternating current reverses. However, the half-wave single-phase circuit is rarely if ever used in practice. Full-wave rectification is obtained by means of a bridge circuit, and both positive and negative half-cycles of the alternating current supply are used. The output of the single-phase bridge or of three-phase circuits used for electroplating rectifiers is equivalent to a direct current supply with a small voltage ripple superimposed upon it. It may be stated that it has not been possible to trace any effect whatsoever on any electro-

chemical process to the ripple in the output voltage of the rectifier, even when single-phase rectifiers are used. It may, in the absence of any evidence either theoretical or practical to the contrary, be assumed, that voltage ripple has no adverse effect.

The rectifier found best for electroplating purposes is of the dry metal type, of the same class as galena crystal, or the composite conduction rectifier, sometimes called the "junction" or "contact" rectifier. In this type of rectifier, high voltage alternating current is

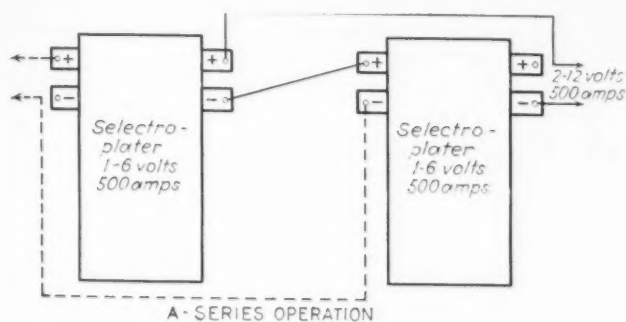


FIG. 2A

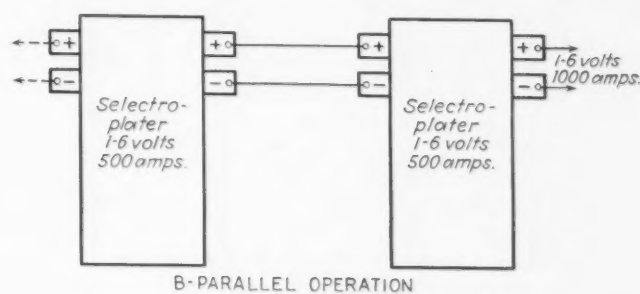


FIG. 2B

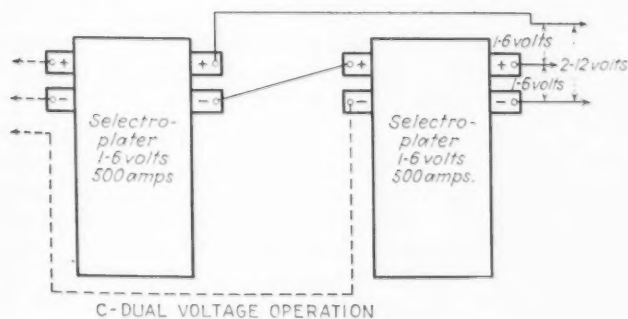


FIG. 2C

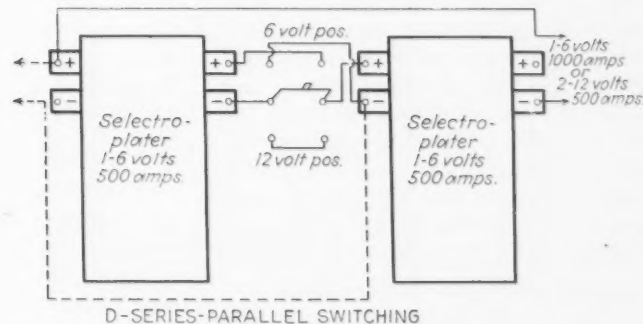


FIG. 2D

FIG. 2—Possible combinations of two rectifiers: (a) series, (b) parallel, (c) dual voltage, showing how two different voltages can be obtained simultaneously from two rectifiers, (d) two rectifiers with switch providing a choice of series or parallel connections.

(Courtesy, L. W. Reinken, W. Green Electric Co.)

led to a suitable step-down transformer which changes the current to low voltage, high amperage alternating current. The low voltage a.c. is led to the rectifier unit which changes it to low voltage direct current, which is led through the

can be put through without additional temperature rise.⁴

In smaller rectifiers cooling fins are used between the disks to radiate the heat generated in the rectifier element. In larger units ventilating fans are used to con-

The transformer or transformers, and cooling are standard devices, and the types of rectifier stacks have been discussed above.

The type and variety of control gear employed varies widely with different manufacturers and different models. For example, one electroplating rectifier unit has no control gear and no meters, consisting simply of a transformer, rectifier and cooling fan. At the other extreme is a custom-built equipment featuring a separate transformer for voltage control, two voltage control tap switches, push-button start-stop with remote control facility, voltmeter and ammeter, a thermostatic overload warning system, and an automatic over-load shut-down device.

The control gear may be employed in different rectifiers and may be classified according to function:

START-STOP—switch, circuit breaker, or contactor.

VOLTAGE CONTROL—taps on primary, taps on secondary, or both; separate voltage control transformer with coarse and fine taps, variable transformer (generally used only on small single-phase rectifiers).

METERS—output voltmeter, output ammeter (both d.c.).

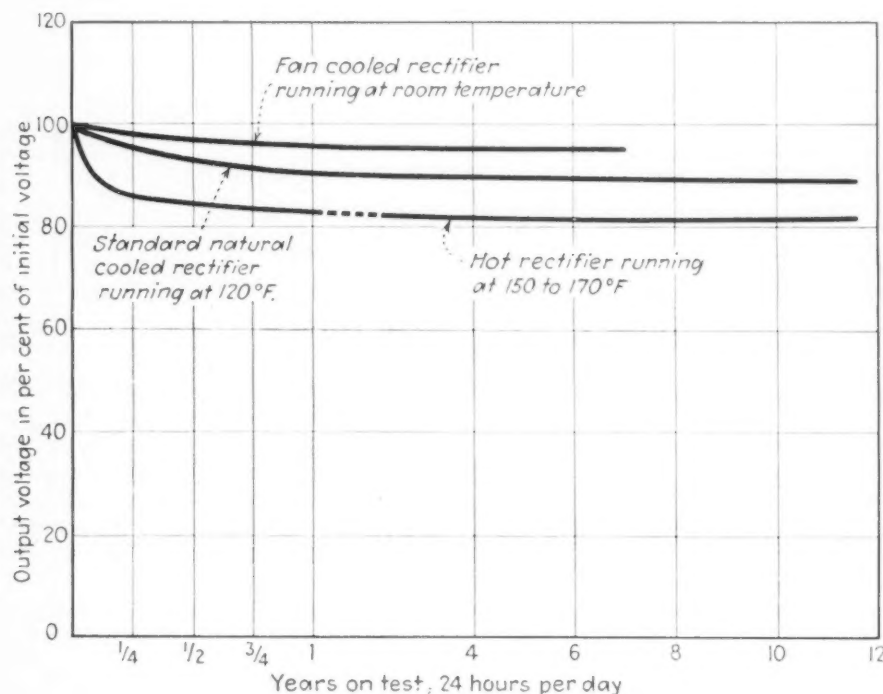


FIG. 3—Stability of copper oxide rectifiers.

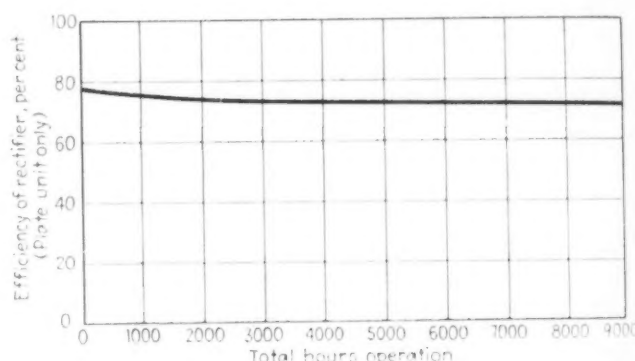
necessary leads, bus bars, controls, etc., to the plating tank.

The rectifier unit in which the current is changed from a.c. to d.c. consists of a metal plate, the surface of which has been coated with another metal or metallic compound (such as copper oxide, magnesium-copper sulphide or selenium). It is at the contact surface of these two dissimilar surfaces, the metal plate and the surface coating, that rectification takes place in a distance infinitely small, without the presence of any arcs or solutions, and with no moving parts involved.⁵ Contact for one polarity is made to the plate, and for the other, to the coating, by various mechanical means. A number of such plates are then assembled with air spaces between them and the proper a.c. and d.c. terminals, to form the rectifier "stack" or unit.

Each rectifier element has its maximum voltage and maximum current capacity. The power which can be rectified with any element is governed by the temperature rise of that element. The rating can be increased safely if greater power

FIG. 4—Curve showing aging characteristics of a copper oxide rectifier plate. Plates $4\frac{3}{8} \times 10$ in., continuous output; 30 amp., 30 volts.

(Courtesy, Hanson-Van Winkle-Mun-ning Co.)



serve space and reduce costs by eliminating or diminishing the size of cooling fins. In at least one larger installation in Europe, oil cooling has been successfully used.

Rectifier Construction

This simple explanation describes the construction of the rectifier in principle, but in practice, of course, a number of accessory parts are necessary.

The principal parts of an assembled rectifier are:

- (1) The transformer.
- (2) The rectifier stack or unit.
- (3) The control gear.

PROTECTIVE DEVICES—input fuses, output fuses, input circuit breaker, air vane relay, thermostatic warning, thermostatic shut-down.

All of the parts described may be assembled into one cabinet, with meters, switches, etc., which may be set in any clean, well ventilated spot, connected to the a.c. power leads and the d.c. output leads. No special foundation or grouting-in is required. A starting button is pushed, the voltage set at the desired rate by means of the tap changing switch and the rectifier is in full operation.

Most rectifiers are available in 6 and 12-volt types and some rectifiers are built to any specified low voltage, from 3 to 48 volts, in 3 or 6-volt steps. Under normal operation they have a power factor of 90 per cent or more. They can be built to take current from any type of a.c. power lines, at any frequency or any voltage, 2-phase, 3-phase, 50 or 60 cycles, 3 or 4 wire power supply.

Another feature of some rectifiers is their flexibility as a current providing unit. They can be connected like batteries; in series or parallel. For example, two rectifiers, each of which can deliver 100 amp. at 6 volts, can be connected in three ways: (a) in series, to give 100 amp. at 12 volts; (b) in parallel to give 200 amp. at 6 volts; (c) in series-parallel arrangement with a switch which will provide at will either series or parallel power output. Similarly, with four units, each supplying 100 amp. at 6 volts, it is possible to have 11 different combinations, providing from 400 amp. at 6 volts on the one hand to 100 amp. at 24 volts on the other. And, of course, with a number of units in any set, the number of possible hook-ups increases by permutations and combinations.

If the rectifier installation is made up of a number of small units, no possible changes in plant methods or operations can make this equipment obsolete. Changes in voltage and current required may be made by dividing the unit properly and allocating smaller combinations where they can be effectively used. In this way the current-generating capacity can be kept abreast of plant expansion without scrapping old equipment.

Where special equipment is required for special conditions, rectifiers can be "custom-built" without difficulty.

Improved design has made it possible to save valuable plating room space, by locating the rectifier unit outside of the room or in some out-of-the-way corner, using remote control cubicles containing the voltmeter, ammeter, push-button stations and the necessary voltage control equipment. This voltage control cubicle can be placed near the tank or in any other convenient place, while the rectifier unit may be located at some distance.

Another improvement is the use of the two-dial switch instead of one, giving the operator up to 144 steps of control from 1/6 of the rated voltage to the maximum voltage. In some makes the dial switches operate tapped auto transformers and are so constructed that the voltage does not fall to zero during the changing of the taps from one position to another.

Some rectifiers may also be operated at 1/2 volt above the rating of the machine itself, in order to provide for a 1/2-volt drop in the bus bar from the remote rectifier unit cubicle to the tank.

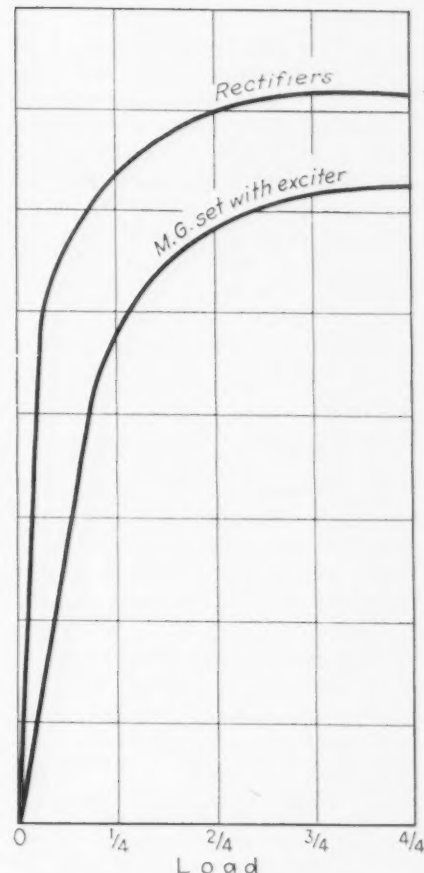


FIG. 7—Overall efficiency of a small copper oxide rectifier and a small motor-generator set.

(Courtesy, Hanson-Van Winkle-Munning Co.)

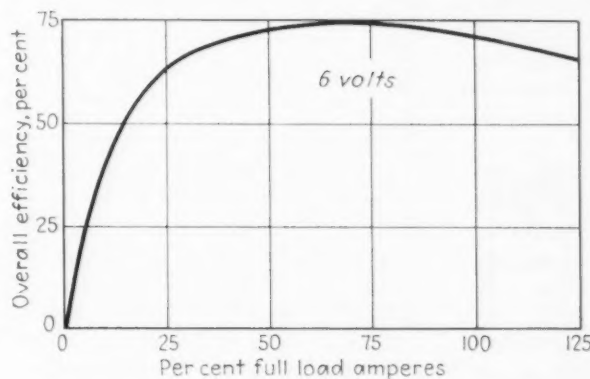


FIG. 6—Overall efficiency of 500 amp., 6-volt copper oxide rectifier. Note the uniformly high efficiency (65 to 75 per cent) between 25 and 125 per cent load.

(Courtesy General Electric Co.)

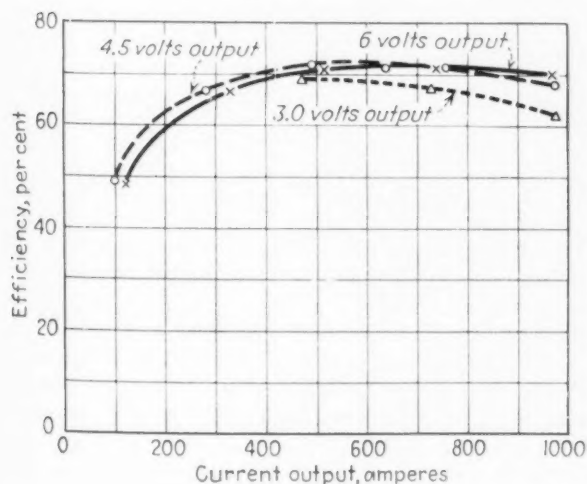


FIG. 5—Efficiency of a 6-volt, 1000-amp. copper oxide rectifier at various voltages, after 400 hr. of operation at full load.

(Courtesy, Hanson-Van Winkle-Munning Co.)

The "overload rating" varies with different types of rectifiers. On some rectifiers no overload is permissible, on others 25 per cent for 2 hr. is permissible, and, on some, 25 per cent continuous overloading is allowable.

Costs

As in all types of equipment, costs vary from one make to another. In general, for standard sizes and designs, it may be stated that the cost of rectifiers varies from substantially below to a little above that of a motor-generator set of the same capacity, quality and

standard of performance. But, since the cost of installing a rectifier is practically nothing, and it is necessary to make provision for installing motor-generator sets, the cost of rectifiers installed is about the same or somewhat less than motor-generator sets, including direct-connected exciters and complete panel boards. In some instances, however, one type of rectifier has been installed for approximately half the cost of motor-generator sets of the same capacity.

Advantages of Rectifiers

(1) *Simple and inexpensive installation.* No special foundation is required and the rectifier can be easily moved from place to place in the plant. Installation cost is almost nothing.

The rectifier can be built for remote control if desired. The controls may be set at the tank and the unit itself in a cubicle at a place free from fumes.

(2) *Compactness.* Rectifiers are especially economical of floor space as they can be built in sky-scraper design rather than along horizontal lines. For example, the selenium rectifier of 10 kw. capacity requires less than 3 sq. ft., and a 20-kw. unit less than 6 sq. ft. of floor space. A 40-kw. motor-generator installation including exciter, panel board, etc., requires over 100 sq. ft., compared with 12 sq. ft. for two selenium rectifiers used to make up this capacity.

In addition, the considerably lighter weight of rectifiers makes it possible to install them in places already too heavily loaded to permit the added load of a motor-generator set.

(3) *Mobility.* By reason of its extreme lightness and its small cubic contents, rectifiers can be easily moved from one place to another as required.

(4) *Freedom from maintenance costs, long life.* The rectifier equipment has no moving parts excepting the cooling fan which requires only occasional lubrication. Maintenance costs are, therefore, practically nil.

In the electronic type of rectifier no physical or chemical change takes place with use, and life of the rectifying element is practically unlimited. The only change is a phenomenon described as "aging" in the copper oxide and selenium rectifiers. During the first 5000 to 10,000 hr. of use there is a grad-

ual slight drop in output voltage, which ultimately reaches a constant level where it remains. To allow for this drop, such rectifiers are rated on the name plate, in terms of their aged, constant, voltage. The magnesium-copper sulphide rectifier is "aged in" by its manufacturer before its sale and its output is constant throughout its life.

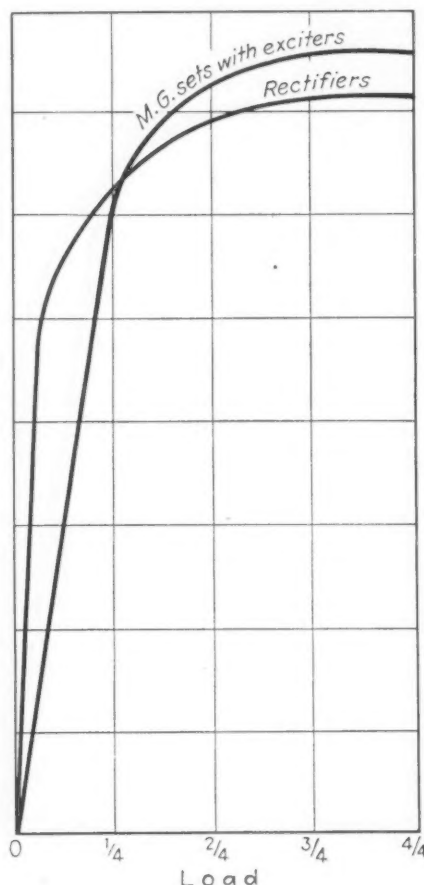


FIG. 8—Comparison curves showing overall efficiency of a large copper oxide rectifier and a large motor-generator set about 3000 amp., 6 volt.

(Courtesy, Hanson-Van Winkle-Munning Co.)

The rectifier is able to operate in ambient temperatures over a wide range, from minus 40 deg. C. to plus 35 deg. C., and in some cases to 150 deg. C. continuously, depending upon the type employed.

If by some accident or unforeseeable circumstance, the rectifier assembly should fail, it can be easily and simply replaced, although to date, little trouble of this kind has been reported. The other parts in the rectifier, such as circuit breaker, voltage control switches, meters, fans, transformer, etc., are all standard equipment and can be replaced at any time.

It is necessary to protect the rectifier unit from corrosion and for that reason it is coated with several coats of varnish, lacquer or baked enamel to prevent attack from industrial atmospheres, fumes, etc. In some cases, the switches are provided with silver, silver plated or cadmium plated contacts. Nevertheless, it is the part of good judgment to place rectifiers where they will be as free as possible from fumes.

(5) *Instantaneous starting.* There is no warming up or waiting period. The rectifier delivers current at once, in full.

(6) *High efficiency.* In the average plant, hour-to-hour loads will vary between 20 per cent and 100 per cent of capacity. At high or low load, the rectifier should operate at practically constant efficiency. While this efficiency varies with the type of rectifier, it is so much higher than the motor-generator set at low loads that substantial savings are possible by reason of this factor alone.

(7) *Close voltage control.* One rectifier incorporates, in addition to the main transformer, a tapped voltage transformer which is connected to two voltage controls. Each of these controls has several positions, giving a total of the product of the number of positions in each control, up to a possible maximum of 12 x 12, or 144 steps. The minimum voltage may be as low as zero, if desired.

A good output voltage wave is obtained, containing a small ripple on non-inductive load. This ripple on 3-phase rectifiers, is between 5 per cent and 15 per cent. According to reports, however, this ripple has no effect whatever on the quality of the metal deposit.

(8) *Power economy.* Probably the most important operating advantage of the rectifier is its applicability as a separate current-providing unit for each individual tank, maintaining full load efficiency, and eliminating long bus-bar losses.

Moreover, if each tank or group of tanks is independent of the others, fluctuating loads in one tank will not affect the operation of the others.

In motor-generator sets voltages are reduced by means of resistances in rheostats which convert the excess voltage into heat. In other words, the operator pays for the current, but tosses it off into the

air. With the rectifier and especially with a number of separate units, properly connected, this type of waste is eliminated. By the use of the voltage regulator, it is possible to eliminate the individual tank rheostat. No-load losses are avoided because the operator can immediately shut down the rectifier when the tank is not in use. The only power used and paid for is that which is actually supplied to work the tanks.

(9) *Overload capacity.* Some rectifiers are rated to withstand a continuous overload of 25 per cent;

some, for 25 per cent for 2 hr.; and some permit even higher overloads for short periods, although such operation is not recommended. Visual and audible warning signals or automatic shut-down when the equipment is being overloaded to a dangerous extent, are standard equipment on some units.

(10) *Noiseless.* The only moving part is a fan.

(11) *Power flexibility.* One of the outstanding advantages of rectifiers is their electrical flexibility as a source of power. Combinations by series-parallel arrangement, are

possible in wide variety to allow for practically any condition that may arise.

For example, a single large rectifier may be substituted for a standard motor-generator set and will give perfectly satisfactory results. However, in many instances, it is advisable to make up the source of power out of a number of smaller units which can be connected in a variety of ways to suit varied conditions.

Ed. Note:—Next week the author continues with details on various types and makes of rectifiers.

New Test for Organic Finishes

AN improved technique for testing the toughness, hardness and adherence of organic coatings quantitatively has been developed by Bell Telephone Laboratories, Inc., New York. In the test, the specimen is wrapped around a conical mandrel and the elongation limit of the finish on the specimen is computed from the position of the cracks caused by the bending.

The mandrel, conical in shape and carrying in diameter from $\frac{1}{8}$ in. to $\frac{1}{2}$ in., has been found more satisfactory than previous methods of testing, permitting determinations on a single test specimen and giving actual values at the fracture instead of limiting values. Prior examinations were made by bending the specimens over cylindrical mandrels of different radii, stretching the convex side of the coated panel and determining the percentage of elongation of the film before it fractured.

The conical mandrel test, since only a single wrapping mechanism

is required, is mechanically simpler and less expensive than the procedure used in making the examinations on the multiple cylindrical mandrels. The relation between elongation of the finish and the mandrel diameter is different for various metals, necessitating separate determinations for several metals in common use. The values for one such metal are shown in the accompanying illustration. The

elongation of the outer face of a bent panel has to be measured accurately, with allowances being made for very slight error due to film thickness and mandrel shape. The speed of stretch is carefully controlled in the bending test, usually being about 15 sec. for a 180-deg. bend.

The conical mandrel test has proved to be reliable and economical in studies of organic finished materials, and will contribute materially to the development of increasingly durable finishes.

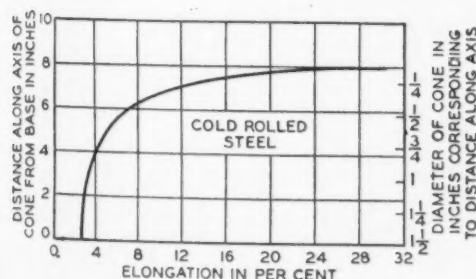
Tool Index and Steel Selector

CONTINUING a trend toward the simplification of tool steel selection and heat treatment, the Carpenter Steel Co. has announced another step toward greater ease in the choice of tool steels. A 96-page addition to the company's matched tool steel manual has been made which alphabetically thumb indexes all types of tools and dies in general use. The various conditions each type of die or tool may meet in fabrication, heat treatment, and service are analyzed and specific tool steels recommended to meet each set of possible conditions. The selector is based on the matched set method of tool steel selection, which has behind it six years of tool room experience, but is a much greater simplification, developed at the request of tool makers and with their collaboration. After becoming familiar with this new selector tool

makers should be able to locate easily the recommended steel for any standard tool within a minute or two.

In addition to the quick reference tool index and steel selector, the new Carpenter manual retains all the material in the old, revised to accord with latest research data and tool making practice. This section contains instructions for using the matched set method and descriptions of the nine Carpenter matched tool steels, valuable data and information on speeds of heating for hardening, lengths of time to reach drawing temperatures, furnace atmospheres, and a method of estimating them by eye, quenching methods, torsion impact toughness, and other help. The entire manual now contains 159 pages. Copies of this booklet are obtainable from the Carpenter Steel Co.

THE IRON AGE, September 11, 1941—53



THE elongation limit of an organic finish can be computed from the diameter of the mandrel where the finish cracks. This limit varies with different backing materials, necessitating determinations for each type.

Welding Technique for M

RAILROAD service conditions subject manganese steel to a dynamic compression which can be otherwise described as repeated impact or wheel pound. As is generally known, repeated impact work-hardens manganese steel; and, where the metal "flow" under such impact exceeds the ductility of the material, there may follow incipient failure by cracking. Work-hardening can be developed to a point at which all ductility is lost. While no accurate data are available, this limit is believed to be considerably above 500 in the Brinell scale of hardness.

Numerous failures in the nature of welds peeling from the parent metal have occurred where weld metal was deposited directly upon such work-hardened surfaces. While visiting trackwork welding crews of various American railroads, it is quite interesting to note the diversity of methods of preparation for and the welding of worn manganese steel frogs and crossings. Some crews weld directly upon work-hardened surfaces, while others remove by grinding any spalled or laminated metal, surface cracks, or other defects. The question has often been asked as to how deep is the "flowed" or work-hardened layer on worn manganese steel trackwork so that a guide may be available for the welding technique and practice during the repair of worn units.

Therefore, to learn, if possible, how much metal should be removed from a worn manganese steel frog or crossing before depositing the weld metal, two adjacent sections were prepared from a frog which had been worn down $\frac{3}{8}$ in. These sections were cut under water, using a $\frac{1}{8}$ in. high speed cut-off wheel, and submitted to the Amsco

research department for examination. Three specimens for microscopic examination were cut from one sample and Brinell hardness determinations were made at various distances from the worn surface. The other was polished and hot etched on one side, while a Rockwell hardness exploration was made on the opposite side. These specimens are illustrated in Figs. 1 and 2.

A study of the hardness exploration chart, Fig. 3, will show that work-hardening extends to a considerable depth. The intensive hardening indicated by the series of Brinell impressions taken upon the worn surface of the casting is indicative that this extreme condition is limited to the actual wearing surface, especially where false flanges of worn wheels have exerted maximum pressure, and also

where new wheels have transferred the maximum load. The upper row of Rockwell hardness readings shows quite plainly the increased hardness developed where the material has deformed or flowed under impact and pressure. This is especially noticeable in the upper left hand corner of the chart where no surface hardening is present, but where the internal metal has been hardened considerably by the extruding action of wheel pressure. Analysis of the chart leads to the conclusion that light wheel loads tend to produce the surface hardening, while heavy loads will cause deeper hardening and more extensive flow.

Microscopic examination of samples cut from the first specimen revealed indications of appreciable work-hardening to a depth of at

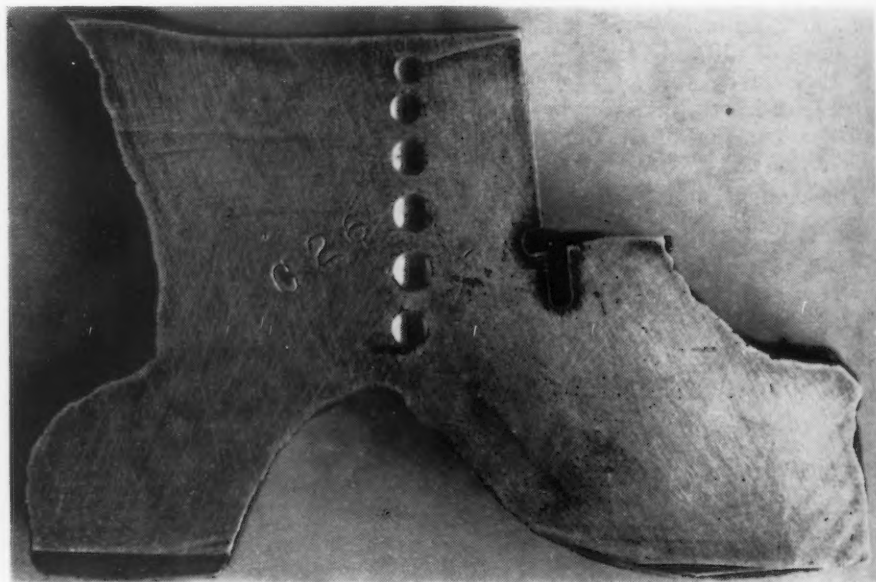


FIG. 1—Cross-section of worn manganese steel frog showing Brinell hardness impressions. The microscopic specimens shown in Figs. 4, 5 and 6 were cut from this piece.

or Manganese Steel

By D. B. RICE

American Manganese Steel Division
American Brake Shoe & Foundry Co.

—These detailed working data make fool-proof the reclamation of severely worn manganese steel trackwork units.

least 0.80 in. These indications are in the form of slip bands in the individual grains of austenite. Representative micro-structures, photographed at 500 magnifications, are shown in Figs. 4, 5 and 6. Fig. 4 shows the density of the slip bands in the section parallel to and 0.24 in. below the worn surface. Figs. 5 and 6, respectively, portray sections parallel to and 0.50 and 0.80 in. below the worn surface. A comparison of the three photo-micrographs clearly indicates the relative density of the slip bands in each area, which in turn may be interpreted in terms of work-hardening. By comparing Figs. 4, 5 and 6 with Fig. 7, where the absence of slip bands denotes total lack of work-hardening, although some carbide precipitation from heat is present along the grain boundaries, it is possible to obtain a good conception of the varying degrees of

hardness consequent to cold working, which exist to a considerable depth below the worn surface of trackwork castings. Actually these slip bands indicate the precipitation of sub-microscopic ferrite and manganese-iron carbides as a result of the cold working. Increased hardness and decreased ductility are reasonably in proportion to the density of the slip bands and the carbides so precipitated.

The microscope also revealed the presence of small cracks in the work-hardened surface. These cracks extended to a depth of $\frac{1}{4}$

in. in some instances and are the result of flow under impact.

The combined effects of both work hardening and the heat of welding must be considered if good results are to be attained by welding for purposes of reclamation.

Microscopic study of the effects of the heat of welding on manganese castings shows that where the temperature of the parent metal has been raised enough to overcome the sluggishness of the transformation of the metastable austenite, considerable precipitation of manganese-iron carbides will take place. This precipitation occurs at the grain boundaries and is the product of both time and temperature. Low thermal conductivity tends to concentrate it in a narrow band adjacent to the line of fusion when the intervals of heat application are not excessively long. It is characterized by an increased hardness, together with decreased ductility. Fig. 7 indicates the precipitation present in the manganese steel parent metal $\frac{1}{4}$ in. below the line of fusion of a nickel manganese weld. No work-hardening had occurred prior to welding, as indicated by the lack of typical slip band formation. Carbides precipitated by the heat alone are apparent along some boundaries of the austenite grains. If cold-working precedes heating, much of the carbide will be precipitated along the slip planes. The total amount thrown out of solid solution under the com-

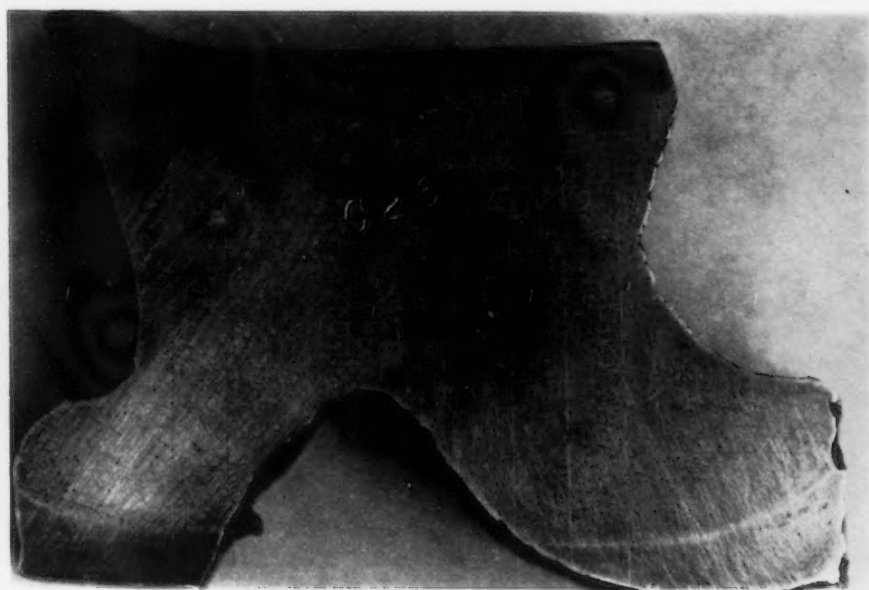


FIG. 2—Cross-section adjacent to Fig. 1. The intersection lines are the loci of Rockwell hardness determinations shown in Fig. 3.

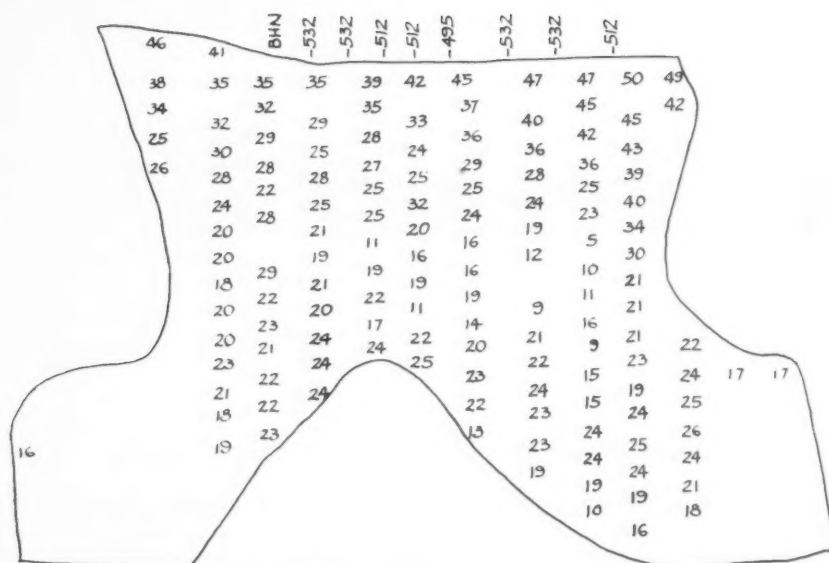


FIG. 3—Hardness exploration chart showing extensive internal work-hardening of manganese steel trackwork members. Extreme hardness is limited to the wearing surface.

bined conditions will be greater; and the increase in hardness and the decrease in ductility will tend to be greater than with either condition alone. An exact evaluation

of these two factors is not available at the moment, for such determinations are obtainable only through a long series of careful experiments.

Fig. 8 is representative of the parent metal structure in work-hardened manganese steel below the junction of a nickel-manganese steel weld deposit. A study of this illustration and the comparison of it with Fig. 7 will show quite conclusively the effect of high temperatures directly below the weld metal deposit in quantity of carbides precipitated. The combined precipitation by both heat and previous work-hardening has produced a large percentage of carbide in the area, with its proportionate increase in hardness and decrease in ductility.

The conclusions derived from these studies are as follows:

- (A) Work - hardened metal should be removed from the surface of worn manganese trackwork castings to a depth of at least $\frac{1}{4}$ in.
- (B) Optimum results will be obtained by keeping the total heat of welding as low as possible.

Using these conclusions as a basis, a procedure has been developed for preparatory work and welding, to minimize inherent disadvantages in

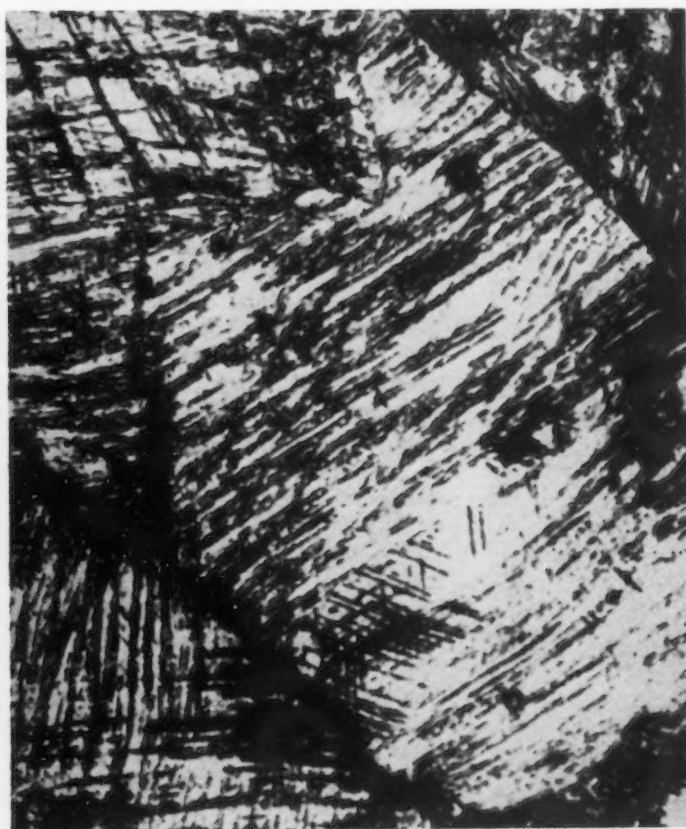


FIG. 4—This section was parallel to and 0.24 in. below the wearing surface of the frog section shown in Fig. 1. At 500 diameters.

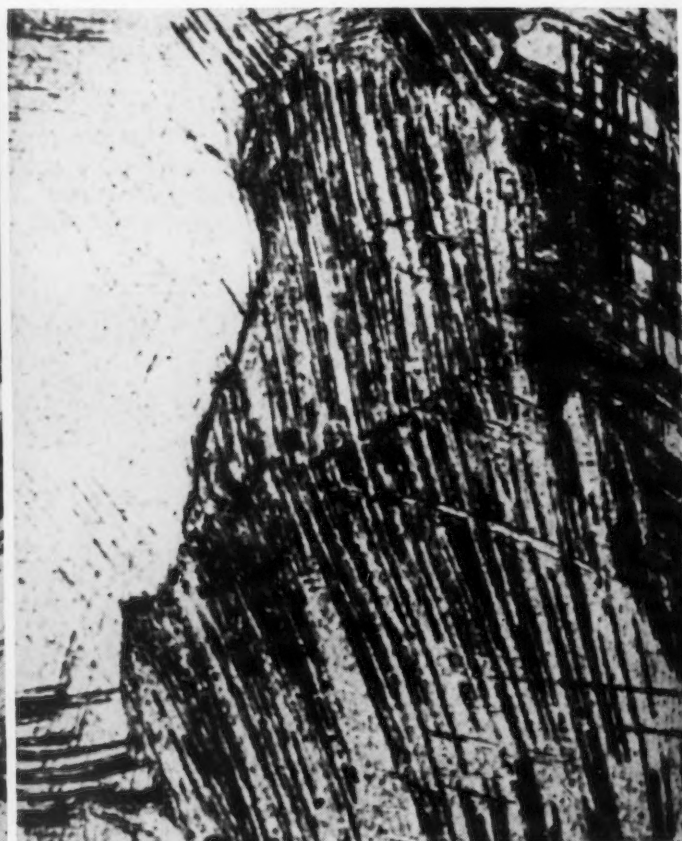


FIG. 5—This section was parallel to and 0.50 in. below the wearing surface of the frog section shown in Fig. 1. At 500 diameters.

manganese steel trackwork welding and so to obtain satisfactory service from reclaimed castings.

There are certain areas on the surface of all manganese steel trackwork castings which are subjected in service to impact and the heaviest concentrated loads. It is known that when weld failures occur, they are invariably within these areas. Thus, there is justification in suggesting the removal of at least $\frac{1}{4}$ in. of the worn, cold-worked surface within the limits of the so-termed "impact areas." In many cases, particularly on crossings, this should be increased to the depth of the indicated flow on the wall of the flangeway along the edges of the receiving points. The grinding should be done so as to provide a shelf with a preponderance of horizontal surface to receive the deposited metal, rather than to bevel off at an angle. Manganese steel welds in compression have considerably more impact resistance than those in shear.

A rough test, suitable for field use, may be made to insure the re-

FIG. 8—Nickel-manganese steel weld metal (left); and general carbide precipitation in work-hardened manganese steel base metal (right), a very brittle structure. At 100 diameters.

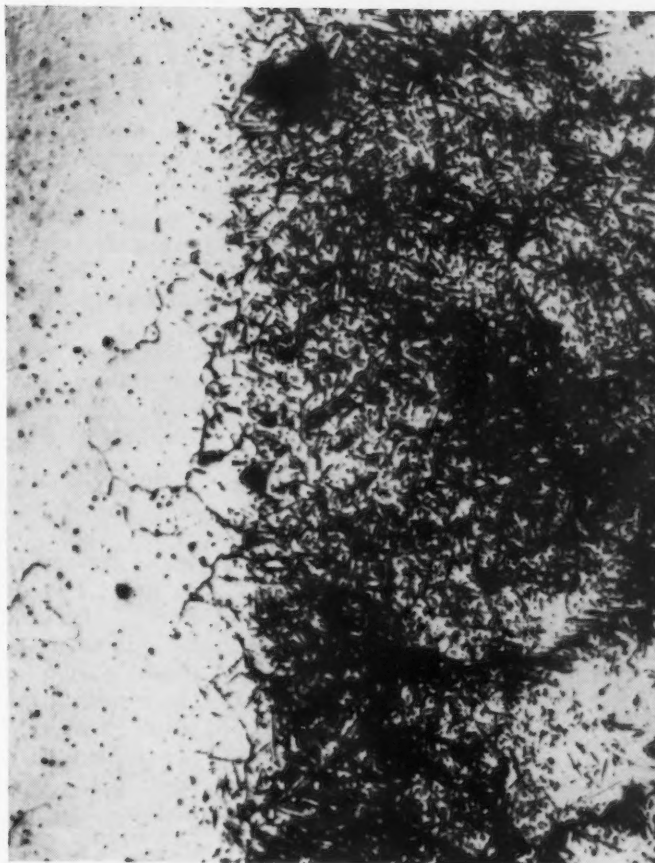


FIG. 6—This section was parallel to and 0.80 in. below the wearing surface of the frog section shown in Fig. 1. At 500 diameters.

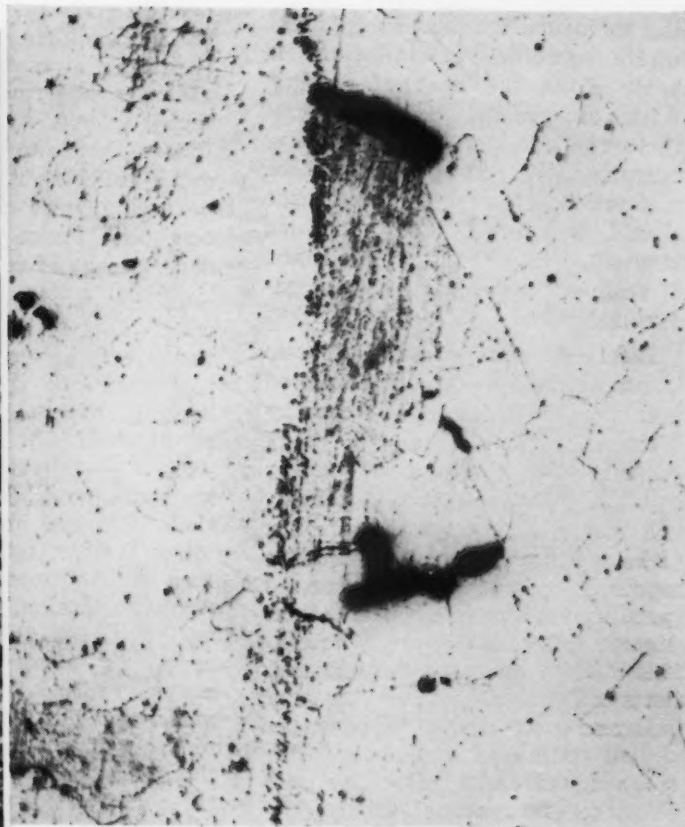


FIG. 7—Nickel-manganese steel weld metal (left); and manganese steel base metal (right). Shows carbide precipitation in boundaries of austenite grains in non-work-hardened base metal. At 100 diameters.

removal of extreme work-hardened material by using an ordinary center punch. Very little impression will be made by such an instrument upon steel with a hardness over 400 Brinell, but when material has been reached which is 250 Brinell or under, the punch indications are appreciable.

Where it is necessary to remove large amounts of work-hardened metal, conservation of time dictates the use of oxy-acetylene or arc cutting. When using the acetylene torch, a relatively high oxygen pressure is preferable to speed up the operation and to reduce heat concentrations. Arc cutting should be controlled as in welding to avoid excessive local heating with its resulting precipitation of carbides to a considerable depth. Where speed is essential, as on work being done in traffic, control of localized heat may be accomplished by making cuts of short duration and immediately quenching the cut surfaces and surrounding area of the casting with cold water. All torch or arc cut surfaces should be cleaned of oxide and scale, and sufficient metal should be removed by grinding to insure elimination of areas where carbide precipitation is heavy from the heat of cutting. Where excessive heat concentrations are avoided in the burning operation, the removal of $\frac{1}{8}$ in. of material from the cut surface should be satisfactory. Sections impossible to grind may be cleaned of scale with an air or hand hammer and chisel.

Electrode size for the first two layers of weld metal to be applied over the "impact area" is worthy of consideration. Electrodes of $\frac{1}{8}$ in. or $\frac{5}{32}$ in. diameter, using suitable welding circuit amperage, will materially reduce the amount of heat which the parent metal is required to absorb, with corresponding reduction in the area and amount of carbide precipitation. This method assures a minimum of disturbed structure beneath the weld, and the two or more layers as applied with small diameter electrodes constitute a protective pad of nickel-manganese steel weld metal to absorb the higher temperatures created by the larger electrodes used for the major portion of the buildup work. The nickel content of the electrode metal inhibits the precipitation of carbides

within the weld metal itself which, therefore, is not affected by the heat of additional layers. Suitable amperages for application of various sized Amsco nickel-manganese electrodes are as follows:

Diameter Rod, In.	Bare Rod, D.C. Amperes	Coated Rod, D.C. Amperes	Coated Rod, A.C. Amperes
$\frac{1}{8}$	80 to 100	75 to 90	80 to 100
$\frac{5}{32}$	90 to 125	85 to 110	90 to 125
$\frac{3}{16}$	110 to 150	100 to 130	110 to 150
$\frac{1}{4}$	135 to 160	110 to 140	135 to 160

Beads deposited by $\frac{1}{8}$ in. and $\frac{5}{32}$ in. electrodes should be about $\frac{1}{2}$ in. wide, while $\frac{3}{16}$ in. and $\frac{1}{4}$ in. electrodes should deposit beads $\frac{3}{4}$ in. to 1 in. in width. The thickness of the bead should be limited to $\frac{3}{16}$ in. in all cases. Individual beads should be terminated with the consumption of one-half of the usual 18 in. electrode. Bead craters should be filled to the height of the body of the bead before the arc is broken, and each bead should be thoroughly peened, beginning at the filled crater and peening backward toward the starting point. Air or hand hammers may be used for this purpose, but peening must be thorough in order to relieve shrinkage stresses and to provide a denser material that is less susceptible to flow and deformation. It is advisable to plan the bead layout in each layer so that there will be no adjacent craters where accumulated stress may result in the development of cracks or checks.

In the properly executed weld with planned bead distribution, there will be no excessive stress concentrations or localized overheating of the casting. Parent metal should be cleaned carefully with a wire brush before depositing each bead, because accumulations of oxide, bits of coating and other foreign material will interfere with proper penetration and complete fusion, when electrodes are handled at the specified amperages. Lack of cleanliness often causes welders to use a greater amperage for the deposition of nickel-manganese steel electrodes than is actually required under better practice for good penetration and fusion.

Completed welds should be built up higher than the finished dimensions to permit the removal of all irregularities and to provide a smooth, straight surface following

the grinding operation. It is desirable to subject completed welds to the peening and leveling action of several trains before grinding.

them. This practice should be limited, however, for the higher points will quickly work-harden and the localized hardness so initiated may set up stresses which are never completely relieved. Sharp edges where subjected to traffic should be obviated by grinding a radius on all edges that will be followed by the wheel flanges. Where the gage side of the flange is involved, the radius should be about $\frac{5}{8}$ in. This will permit a good portion of the anticipated flow to take place before a sharp edge is created with the customary tendency to spall that follows. Edges followed by the guard side of the flange are ordinarily adequately protected by providing a radius of $\frac{3}{8}$ in.

Welding of manganese steel trackwork during extremely cold weather should be preceded by a slight preheat, limited to 200 deg. F., which will usually prevent the tendency to crack in both parent and weld metal, found upon the application of welds to manganese castings at 0 deg. F. or lower.

Reclamation welding of manganese steel trackwork units is in no sense comparable to the predetermined setup of production fabrication. Each frog or crossing must be considered as an individual job with peculiarities of its own. It is often disastrous to hurry with this type of work, because irreparable damage can be done by overheating. Experience, based upon an accurate record of costs and service obtained, should be the deciding factor in determining whether the individual unit should be welded in track, taken out of service for the welding operation, or scrapped as definitely not economical to weld. The cost of such a record is a minor item compared to the saving to be accomplished by its use.

Roll Welding Speeds Airplane Production

A SPEED-UP production tool which Lockheed Aircraft Corp., Burbank, Cal., uses to good advantage is a combination spot and roll welder, having a 450 kva. nominal rating. This equipment is said to operate more than three times faster than the ordinary spot welder and is from eight to ten times faster than riveting. In a recent test on 0.025 in. 24ST Alclad, 60,000 welds were made in a single 8 hr. shift.

The machine is capable of consistently turning out 30,000 to 50,000 welds per shift on aluminum alloys, the rate being governed by the thickness of the material being welded. Current impulses that make the welds are controlled electronically, giving absolute uniform spacing.

The roll welder is used principally on flat straight work. However, by setting the shaft of the lower welding wheel to a 15-deg.

angle and turning the welding face of the wheel to the same angle, parts can be welded that are otherwise inaccessible. The maximum thickness of two pieces of metal that can be welded by this method is 0.051 in. 24ST Alclad.

In welding 0.025 in. material a good speed for a spot welding machine is 60 spots per min. However, it is impossible to maintain this speed for any length of time because it is necessary to stop frequently and clean the electrodes. A roll welder, on the other hand, can weld the same material at a linear speed of 60 in. per min., that is, 120 spots per min. when the spacing of $\frac{1}{2}$ in. is used or 240 spots per min. at $\frac{1}{4}$ in. spacing. On 0.018 in. stainless steel, the welding rate can be stepped up to 200 spots per min., or 100 linear in. per min. when the welds are spaced at $\frac{1}{2}$ -in. intervals.

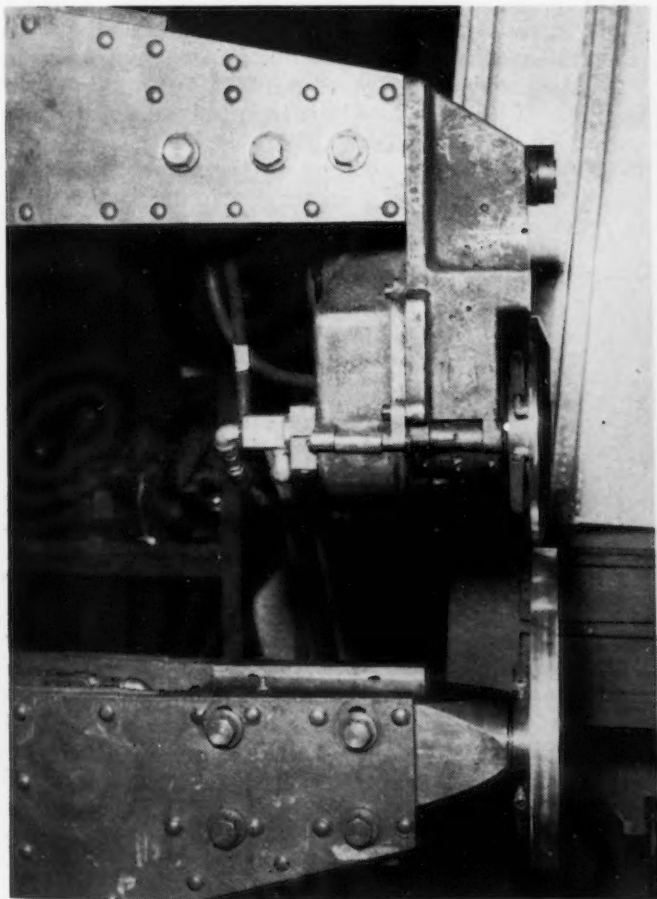
Because the welding wheel is large and thick, there is very little

heating, and the generated heat is dissipated rapidly by running cold water through the shaft and around the welding wheel. This cooling method has been patented by Lockheed. By controlling the heating of the welding wheel, only a slight amount of aluminum is picked up and that which is collected on the wheel can be easily and quickly removed by buffing without stopping the welding operation.

Lockheed Aircraft Corp., has two of these spot and roll welding machines in operation and is installing two more. Among the jobs being performed by them is the welding of 0.016 in. 24ST Alclad cooling fins to 0.032 in. 24ST Alclad wing skins on the P-38 Pursuit Ship. The job on which 60,000 welds were made in an 8 hr. shift by a single operator was the welding of 0.025 in. Alclad stringers to flap skins on the Lockheed Hudson bomber.

Roll welding has appreciably increased production in the Lockheed Aircraft Corp. plant. Here is the welding wheel in position to receive material to be welded. The arm extension permits wide material to be welded, a sample of which can be seen in the background of the picture.

The distance and angle between the rolls can be adjusted, as illustrated below, permitting parts to be welded at angles up to 15 deg. The maximum thickness of two pieces of metal that can be welded on this machine is 0.051 in.



Finish Related to Friction of Chip on Tool

RECENT evidence indicates that great advances in the field of metal cutting may yet be made if cutting fluids can be developed that will reduce the friction at the chip-tool interface, even at very high cutting speeds. This conclusion is drawn in a pamphlet recently published by the Cincinnati Milling Machine Co., under the title, "Chip Formation, Friction and Finish." It brings up to date a research program that has been carried on for over six years. Copies may be obtained by writing the company at Cincinnati.

The authors, Hans Ernst and M. E. Merchant, begin by showing that the surface irregularities on machined surfaces consist of irregularly shaped projections or "steps" with flat tops and abrupt flanks facing in the direction in which the tool has advanced; also that the crystal structure of the material in these steps has been highly distorted and work hardened. Earlier phases of the investigation showed that these steps are actually fragments that have escaped periodically from the formation of the "built-up edge," which under certain conditions precedes the nose of the cutting edge. If formation of the built-up edge is avoided, smoothly machined surfaces result. The built-up edge owes its existence to a large value of coefficient of friction between chip and tool face.

At the beginning of a cut, a relatively low coefficient of friction between the tool and the chip will be found due to the fact that the face of the tool is ordinarily covered with an absorbed film of low shear strength materials. However, as the cut is continued, the powerful adsorption forces of the freshly nascent chip surface passing over the tool face progressively robs this face of its adsorbed film if no source for its replenishment is present. When the coefficient of friction becomes sufficiently high, a built-up edge is formed and a rough surface is produced, whereas the start of the cut is smooth.

Equations developed by the authors indicate that this coefficient of friction is related not only to the shear strength of the materials in contact at the interface of the tool

and work, but also to the relative surface hardness value of the softer of the two contacting surfaces. For this reason, work-hardened material, like a surface that has been previously rough machined with a heavy cut (and hence cold worked to a considerable depth), is much less likely to create a built-up edge condition and hence a rough surface on the finishing cut than fully annealed material.

Effect of Coolants

One of the functions of a cutting fluid is the reduction of adhesion between the chip and the tool face, but the authors distinguish between this type of "lubrication" and that of a wedge shaped film of oil found in journal bearings. Extensive studies using a large number of different organic compounds as cutting fluids have led to the conviction that a chemical reaction between the cutting fluid and the freshly ruptured chip surface, to form a physically stable compound of low shear strength, is essential to effective action. Carbon tetrachloride, for example, is extremely effective due to the formation of a low shear strength, metal-chloride at the chip-tool interface. If the cutting action is carried on at a very low speed (1 in. per min.), a sufficient quantity of the reaction product is formed to remain as a deposit on the work after the excess fluid has evaporated.

When carbon tetrachloride is used on aluminum, the white deposit formed has been identified as aluminum chloride. Pentachlorethane produces a pink deposit, while chloroform produces a black gummy substance. With higher cutting speeds, the quantity of reaction products falls off rapidly, yet even when no such product is visible (in the case of carbon tetrachloride) the effectiveness is not greatly reduced, thus indicating that extremely minute quantities are sufficient in this case to bring about a great reduction in friction on the tool face.

(EDITOR'S NOTE: Carbon tetrachloride is not a practical shop coolant because of its high volatility and the toxic effect of its fumes upon workers. Recently, however, a sta-

bilized chlorinated compound which is non-volatile and non-toxic has been developed that laboratory experiments indicate is equally effective as carbon tetrachloride as a cutting compound. Actual shop tests are now being conducted on this material, which has not yet been placed upon the market.)

Superfinish Explained

Superfinishing consists of cutting away—by means of very fine, fixed, abrasive grains—the rough fragmented material left on the surface of a workpiece by the previous grinding operation. To obtain minimum distortion of the material of the newly formed surface, the superfinishing grains must remove the metal in the form of cleanly cut chips of minute dimensions, which can be accomplished only if the friction between each chip and abrasive grain remains at a low value throughout each cut. To obtain this condition, the path of motion of each grain must be as short as possible in any given direction, thus providing the maximum opportunity for replacement of the absorbed film on the active surface of the grains, Messrs. Ernst and Merchant point out. This is the reason for the short multi-motions commonly provided in machines used in this process. Furthermore, experience has shown that the quality of surface produced can often be greatly improved by the use of cutting fluids carrying active agents like chlorine and sulphur, which act in the manner described to reduce the friction between the cutting tools (abrasive grains) and the chips.

Aside from recommending further research to produce cutting fluids which produce and maintain low shear strength material at the chip-tool interface, the authors suggest investigation of the effects of sulphur and lead in steels toward the same end. Additional research is also necessary to develop new tool materials which will be insoluble with steel, even at extremely high temperatures, and which will have marked anti-seizing properties and a low shear strength at any interface between tool and steel chip. Lastly, they propose that present methods of metal cutting be further scrutinized with an eye to developing new ways of cutting metal that will lessen the difficulty of maintaining a low coefficient of friction between the relatively moving surfaces.

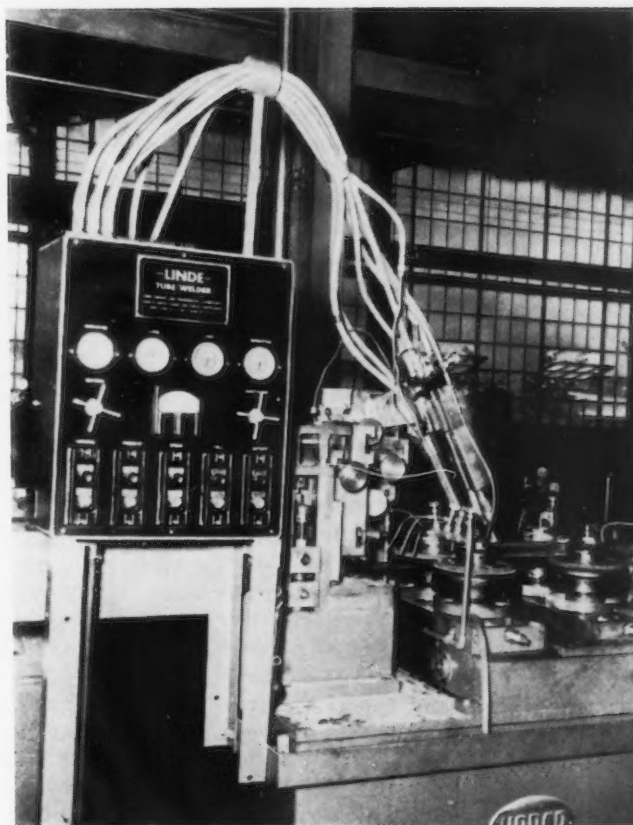
New Oxy-Acetylene Tube Welding Machine

A NEW oxy-acetylene continuous tube welding machine that will weld tubing at speeds ranging from 30 to 150 ft. per min. has been developed by the Yoder Co., Cleveland, in collaboration with the Linde Air Products Co., New York. While the operating cost per foot of welding tubing by this new method is comparable to that made by other continuous welding methods, the initial installation cost is said to be quite low.

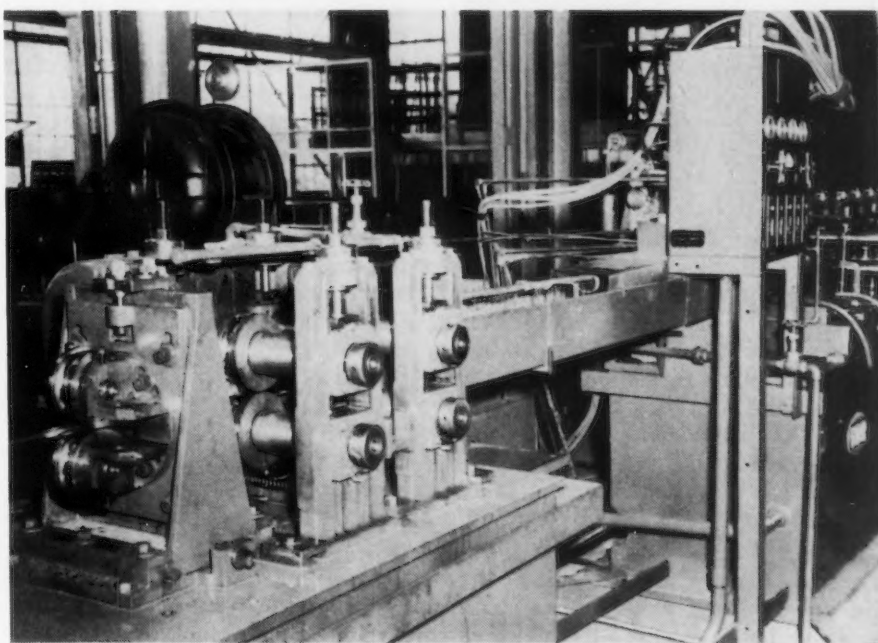
By this new gas welding method, tubing can be produced from unpickled, hot rolled stock for which there is a large demand in the manufacture of such low cost items as exhaust tubing for automobiles, conduit tubing, and structural tubing on which a smooth, polished finish is unnecessary. This equipment also will successfully weld stainless steel tubing; plain carbon, hot and cold rolled tubing; and tubing made from a wide variety of alloy steels. The tube forming operation of this machine is similar to that of other tube welding machines. The flat skelp is fed from a coil through a series of forming stands powered through a worm-gear drive that assures even feeding action, even at high speeds.

Heat is supplied from a new type multiple-flame duplex welding head. Separate gas and oxygen supply lines are provided for the welding and preheat flames. New type regulators, extremely sensitive, provide steady working gas pressures, and can be adjusted at a control panel. Provisions have been made at the control panel for push-button control of the welding blowpipe and the drive mechanism of the machine.

THE supply of oxygen and acetylene gases, the operation of the blowpipe, and the drive motor are controlled at a central panel.



AFTER the tubing has been welded it passes through a water quench trough and a set of straightening rolls before it is cut to length by means of an automatically operated shear.



Russian Blast Furnace Design Changed

AFTER five years of operation, changes in the U. S. S. R. standardization practices of blast furnace construction, along with results on the first full campaigns with standard furnaces at the Voroshilov works, revealing desirable structural alterations, are discussed in a recent article in "Teori. prakt. met.," by N. P. Kaisstro and A. I. Prudnikow, translated in "Foundry Trade Journal," London. In line with this policy, standard Russian blast furnaces (see THE IRON AGE, March 8, 1934, pp. 20-23-58) have been undergoing extensive tests under normal service conditions at various of the newer Soviet steelworks.

After 64 months' operation on the No. 1 furnace at the Voroshilov works, a total of 1,380,000 tons of iron, averaging 700 tons daily, have been produced, and the No. 2 furnace produced 1,310,000 tons of iron in 54 months, for a daily average of 800 tons. As a result of the alterations decided upon, the internal volume of No. 1 furnace has been left unchanged at 32,800 cu. ft., although slight alterations were made in the furnace lines, the throat being enlarged and the height of the hearth raised, as illustrated in the accompanying drawing.

The internal volume of the No. 2 furnace was to be increased to 38,796 cu. ft., but as this would have meant an overall increase of 4.9 ft. in the furnace height and complete reconstruction of the hoisting gear, and in view of various other modifications demanded by the works in the plans of the Gipromes, the state institute for planning metallurgical works, new plans were drawn up. The new plans increased the internal volume to 37,132 cu. ft., which figure has been adopted by the industry as a basis for the reconstruction of the standard furnaces at all other works.

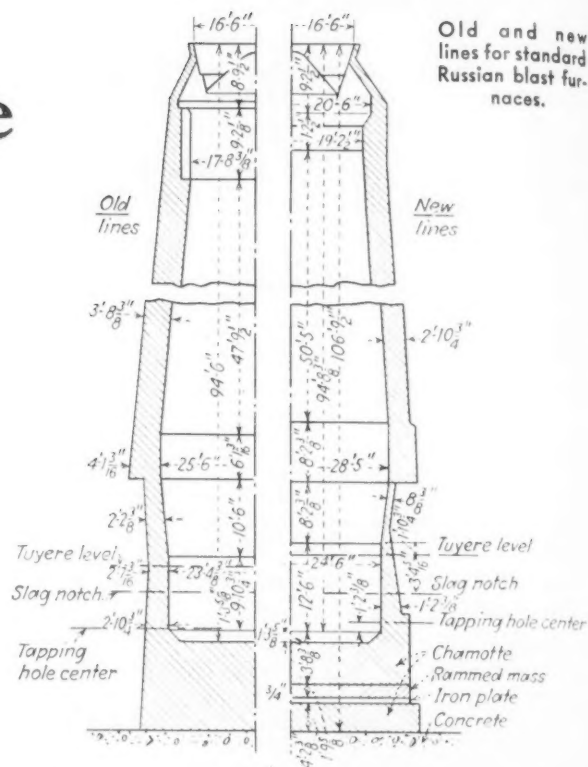
No. 2 furnace volume was increased mainly by reducing the thickness of the walls of the stack and the bosh, details of which are

shown in the illustration. By reducing the bosh height and at the same time lengthening the inwall batter, the open section of the furnace at the lower bosh line, 9.8 ft. above the tuyere level (where the slag is first formed) is 19 per cent greater than in the No. 7 furnace at the Dzerjinsky works after reconstruction and 6.5 per cent greater than in the Gipromes plans.

On breaking up the hearth bottom, only the 10 upper layers had to be removed, the remainder with a total height of 4.25 ft. being left on the concrete foundation. For the first time in such a large furnace, a plate linked to the outer jacket and 0.78 in. thick was placed over the brickwork. The space between the old brickwork and the plate was filled with concrete. A carbonaceous mixture was rammed hot and in thin layers on the base plate to a depth of 22.6 in. The mixture was composed of six parts of coke by volume, one of chromite, three of magnesite, two of graphite, two of fireclay flour, and three of dehydrated tar. Five layers of refractory bricks to a total depth of 67.9 in. were raised on this base.

The external armoring of the furnace consists of steel plating 14.6 ft. high and 1.2 in. thick, which stretches 10 ft. below the center of the tapping hole. The stack and hearth are cooled by 35 cast-iron cooling plates, 14.4 ft. high, 37.7 in. wide and 6.3 in. thick, mounted on the inside of the jacket, and in which water channels 2 in. in diameter are cast. The space between the cooling plates and the brickwork is rammed with the mixture used on the base plate and covered with cement.

A second and third ring of these cooling plates surround the upper portion of the stack and the bosh.



The mantle ring has been widened to carry the whole of the stack brickwork and to secure the bosh jacket and bosh cooling plates, owing to the reduced thickness of the walls. The mantle at the throat did not prove satisfactory during the first campaigns of the furnaces, the cast-iron plates used rapidly deteriorating, so steel castings were substituted in the reconstructed furnace and so arranged that the bulk of the metal was on the outside and removed from the high temperatures. This portion consists of 72 parts with crossed ribs, connected only to the metal jacket of the furnace and not with each other, the intervals between the ribs being filled with firebrick.

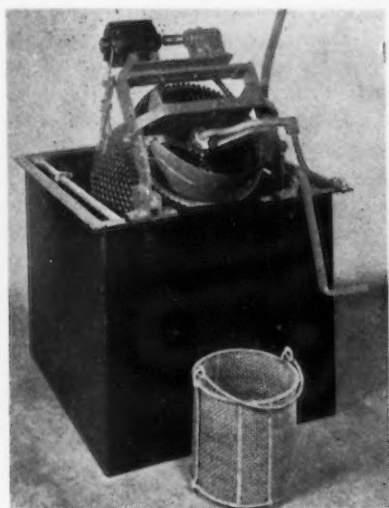
The stack gas main was also enlarged and the design of the tapping platform modified to realize safer working conditions. Arrangements were made to facilitate filling a fourth hot metal ladle in view of the increased output of the furnace. During the first nine months the modified furnace was in operation the estimated output, however, was not attained, although for short intervals it was exceeded. Difficulties occurred in the supply of raw materials as soon as the furnace was restarted and a lower grade of materials had to be used. Nevertheless, an output of 1100 tons of iron a day has on occasion been realized.

New Equipment

Finishing Apparatus

HERE are described some of the newer developments in plating, pickling, cleaning, painting and degreasing apparatus, as well as new enamels, paints, surfacers, and finishing machines.

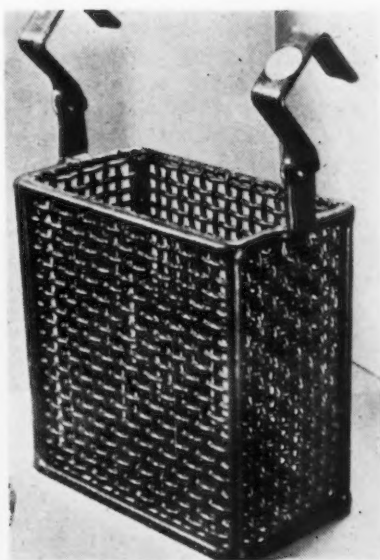
THE *Udylite Corp.*, Detroit, recently announced their "Multi-Purpose" barrel, a new barrel plating machine for cleaning, drying, plating, rinsing and pickling small parts. It will hold from 50 to 70 lb. of parts and has a liquid capacity of 125 gal. This new Multi-Purpose barrel is rugged and efficient, all bearings are above the solution level, and electrical contacts are easily re-



moved. Its tank is made of steel or monel, and the steel tank may be rubber lined for handling corrosive or acid liquids.

Anode Scrap Basket

A NEW type of basket for utilizing scrap anodes has been developed by *Hanson-Van Winkle-Munning Co.*, Matawan, N. J. The basket is made of rubber covered metal and can be hung on anode rods in still tanks and plating bar-



rel tanks. A new anode is inserted in the basket along with the stubs, allowing the stubs to be completely used. This basket can be used in solutions where the temperature does not exceed 190 deg. F.

Electrolytic Blackening of Metals

ELECTRO-EBONOL, a new process developed by the *Enthone Co.*, New Haven, Conn., blackens almost all metal electrolytically. The manufacturers claim their process to be a good substitute for nickel salts for black nickel solutions, and Electro-Ebonol deposits are stated to be harder, blacker, and more adherent than black nickel. Electro-Ebonol salts are supplied ready for use and a solution of 12 oz. per gal. of water is used, operating at temperatures between 140 and 190 deg. F. The black coating is deposited on the

cleaned metal in from 30 sec. to 3 min., depending upon the current density.

Rectifier and Voltage Regulator

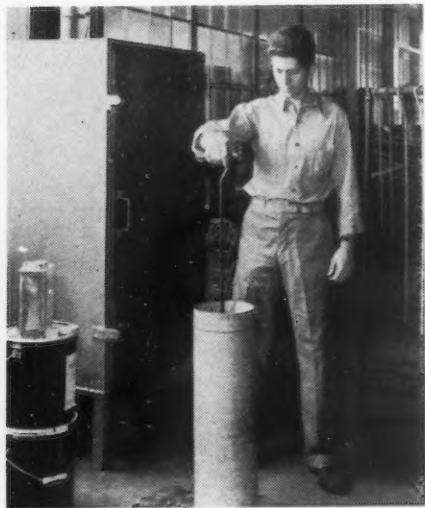
THIS new 500-amp., fan-cooled copper oxide rectifier for electroplating service and a separate "on-load" voltage regulator was developed by the *General Electric Co., Appliance and Merchandise Dept.*, Bridgeport, Conn. It is pointed out



that on-load control permits adjustment during operation without interrupting the current flow into the plating tank. The rectifiers can be mounted anywhere, singly or in groups, and the separate on-load regulator gives the operator complete control at the tank. In applying this rectifier to electroplating, separate units may be used for each plating tank instead of large units serving several tanks, as is customary with rotary equipment.

Flexible Protective Coating

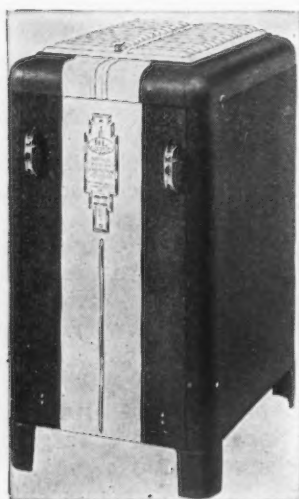
A NEW protective coating material for plating racks, known as Microplastic, was lately announced by the *Michigan Chrome*



and Chemical Co., 6340 East Jefferson Street, Detroit, which provides perfect chemical resistance to acids and plating solutions, alkali cleaners, and petroleum spirits. Perfect adhesion to any metallic surface is claimed, thus permitting going from bright nickel to chrome plating without reracking the work and without fear of contamination of the baths. Microplastic provides the flexibility of soft rubber, will not harden or crack, is free flowing, and with 5 sec. submersion, a part is thoroughly covered without webbing, bridging, or air pockets under the coating.

Dry Plate Rectifier

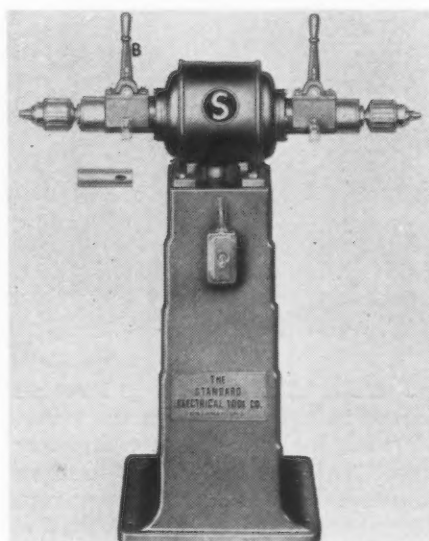
THE Benwood Linze Co., St. Louis, announced the addition to their established line of rectifiers



and rectifier equipment of the B-L dry plate rectifier for electroplating. It is claimed this new rectifier will serve individual tanks, a number of units grouped together in parallel for heavy current loads, or a number of units grouped in series for maximum high voltage requirements. These new rectifiers are available for 300 and 500 amp. capacities, at 6 to 12 volts, operating from 230 to 440 volt, three phase, 60 cycle, a.c. service. Control units are available which provide a variation in voltage from the maximum down to zero volts for the unit.

Double End Polishing Lathe

THE Standard Electrical Tool Co., 1946 West Eighth Street, Cincinnati, have added to their line of equipment a double end speed lathe for polishing, lapping, filing, and burring small parts which can be held in position with a drill or a lathe chuck. The construction permits the spindle at each end to be

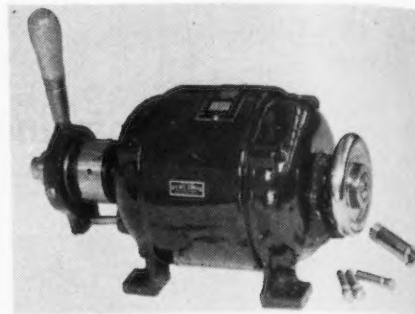


operated at random, starting and stopping either end without interfering with the operation of the opposite end. A hand or foot operated combination clutch and brake stops the work spindle without stopping or changing the motor speed. This double end unit serves two operators independently, conserving floor space.

Polishing Lathe

THE "Speedy" polishing lathe, made by C-W-C Corp., Hawthorne, Cal., was designed for finishing turret lathe products, removing tool marks, polishing round

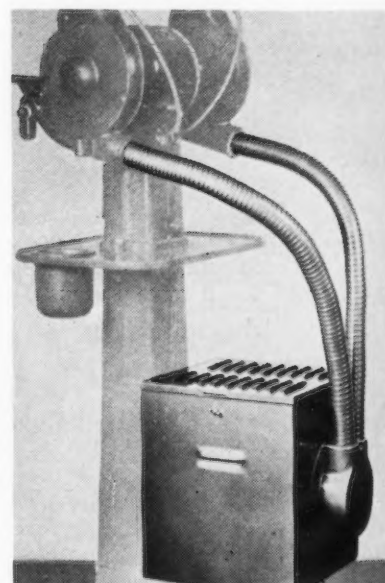
parts, lapping and burnishing. The machine will automatically hold work with considerable variation in diameter without readjusting col-



let tension, and may be actuated by either a hand lever, as illustrated, or by a foot pedal.

Dust Collector

DUSTKOP is a new, low cost, unit-type dust and dirt collector recommended for use with one or more small buffers, polishers, cut-off machines, bench and pedestal grinders, developed by Agat Manufacturing Co., 424 Book Building, Detroit. It is entirely self-contained, requiring no connections with a centralized dirt collecting system, may be rapidly installed, and permits subsequent moving of the machine and the collector as a unit. Collected dust and dirt is removed by lifting the louvered cover, taking out the filter assembly and lifting the pan into which the dust has fallen. Spun glass filters are claimed to stop more than 99 per cent of the dust, and construction

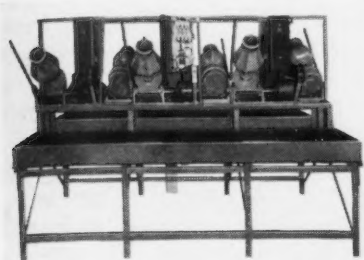


NEW EQUIPMENT

of the Dustkop, it is claimed, is such that it will not support combustion.

Tumbling Machine

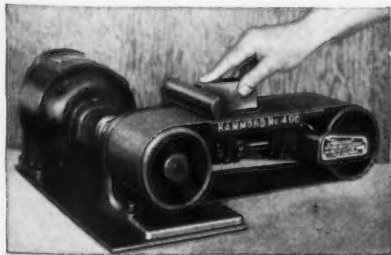
A NEW machine for tumbling or cutting down machine gun parts is offered by *Hanson-Van Winkle-Munning Co.*, Matawan,



N. J., eliminating hand filing for burrs from the gun parts. The unit is built similar to the Mercil oblique barrels, using $\frac{1}{2}$ -hp. totally enclosed ball bearing motors. The small parts which are processed are run with silica sand and oil from 2 to 4 hr., depending upon the size of the load and the size of the pieces being burred. These units can be built in single or multiple barrel types.

Belt Surfacers

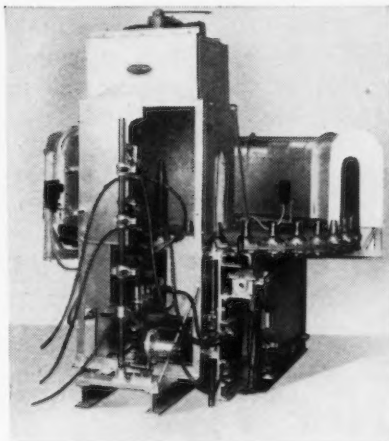
THE Hammond "400," a new bench-type belt surfer for wet or dry buffing, burring, surfacing or polishing plastics, stainless steel, ceramics, hard rubber, stone, lead, aluminum and many other types of materials, is now being manufactured by *Hammond Machinery Builders, Inc.*, Kalamazoo, Mich. Various types of abrasive belts permit the surfer to be used for many types of finishing, from removing sprues and flash from rough castings to producing a fine luster on glass, pottery, and like materials. A work rest, easily adjustable on a segment, is mounted on the frame slightly forward of the drive pulley, and, projecting over the belt, positions the work against the belt. For wet surfacing



operations, a sheet metal casing is fitted around the machine and coolant is piped to the belt by a tube inserted through the side of the hood.

Projectile Sprayer

THE Eclipse Air Brush Co., 400 Park Avenue, Newark, N. J., is building automatic spray machines with electric eye control to coat the inside and outside of projectiles in one operation. The shells are placed on an indexed turntable manually, carried around to a position in front of a set of spray guns that coat the outside while an extension nozzle on another gun comes up to spray the inside. The action of the spray guns is controlled by an electric eye so that



there is no spray unless a shell is in the holder. After being sprayed, the shells enter a steam jacketed oven built over the back of the table. This machine will handle 75-mm. armor piercing shells at a rate of 500 per hr.

Plating Tank Temperature Controls

A SYSTEM involving the direct control of temperature of the water which is circulated through pipe coils or water jackets in plating tanks was recently developed by the *Brown Instrument Co.*, Philadelphia. This system is claimed to maintain uniform plating temperature, save on steam and cold water, insure longer life of the control thermometer because the bulb is not subjected to the destructive action of the plating solution, eliminate the sacrifice of space in the plating tank for installation of the thermometer bulb, and eliminate the necessity of electrically insulating the bulb and connecting tubing from the sides of the tank.

Drying Tunnels

THE Patent-Flex universal infra-drying tunnel, built by the *Wilson Lighting, Inc.*, 152 West Erie Street, Chicago, is claimed to combine the features of a perma-



nent installation into a completely adjustable unit. The tunnels are made in a variety of sizes, instantly adjustable in shape and height, and can be used in banks, double banks, or as completely enclosed tunnels. The reflectors are focused to produce an even heat pattern and the unique design maintains uniform distances between reflector rows regardless of the shape given the tunnel. The reflectors are made of permanent Infra-Alzak, never requiring replating, and are mounted with interlocking brackets that assure complete stability. The reflector strips are made with "snap-on" channels, simplifying wiring and maintenance.

Air Powered Mixer

THE Eastern Engineering Co., 45 Fox Street, New Haven, Conn., recently announced the de-



velopment of a new air powered mixer that operates at a maximum speed of 400 r.p.m., on 40 lb. of air pressure. Its speed can be varied by varying the pressure. The mixer is explosion proof and can be operated without danger in the presence of serious fire hazards. Its special high torque slow speed air motor makes it ideal for heavy mixing and slow power fluid handling and, with its variable speed, it can be used in applications that otherwise would require two or more mixers of various sizes. The motor is completely enclosed, making it suitable for use in places where splashing and fumes cannot be avoided.

Zinc Coating for Metal

INTERNATIONAL RUST-PROOF CORP., Cleveland, recently announced a new system of rustproofing metal during production, known as Irco Zinc Coat, a

dip zinc phosphate coating that can be applied in 5 min. The coating, built up by submerging the part in Irco Zinc Coat bath, is a foundation coating, and any finish coating applied over the zinc coating is claimed to give three to five times longer life.

Vinylite Marking Ink

AN ink for marking Vinylite, a bakelite plastic, has been developed by the Acromark Corp., Elizabeth, N. J., and can be furnished in any standard color, silver, gold, black, and white. It is compounded in a paste form and used as a regular printing ink or by spreading on a flat plate can be used with a rubber stamp or metal die. The color content, once applied to Vinylite will adhere even under most rigid tests such as rubbing, weather tests, salt water tests, and all natural conditions. It is comparatively quick drying and is adap-

table to marking or printing designs, lettering or numbering the Vinylite during and after fabrication.

Rubber-Base Steel Paint

THIS new rubber base metal coating adaptable to all types of exposed iron and steel and marketed under the name of Paratex metal coating, was recently developed by Truscon Laboratories, Detroit. This coating can also be used to protect aluminum, copper and galvanized metal as well as iron and steel. It brushes well, dries fast, and it is claimed that the new paint is unaffected by water and very resistant to chemicals such as lime, acids, and fumes of various kinds. Paratex is sold in quart and gallon cans, 5 and 55-gal. drums, and comes in red, light gray, light green, steel gray, dark green, brown, white, and black.



New Type of Mobile Tractor Crane

KRANE KAR, built by Silent Hoist Winch & Crane Co., Brooklyn, N. Y., available in load capacities of 2½, 5 and 10 tons and powered either by gasoline or Diesel engines, is a mobile power winch tractor. Instead of the customary four wheels or tractor,

Krane Kar has a three-point rubber-tired contact, putting the traction on the front wheels. Also, the danger of overturning and blind spots in operation are reduced and a low center of gravity is achieved. Ease of operation, small turning radius, sharp maneuverability and high speed are features of Krane Kar. Electric magnets, telescopic and special booms, and other accessories may be had for Krane Kar.

The unit shown here is model AX in service of the Pullman Co., Richmond, Cal., equipped with a 29-in. electric magnet. The telescopic boom may be adjusted in length from 15 to 22 ft., there is a folding top over the driver's seat, draw-bar pintle hook for hauling trailers, and gas-electric generator unit for the electro-magnet; also available is a ¾-yd. clamshell bucket with auxiliary drum for holding the line, etc.



Safety for the Speed-Up!

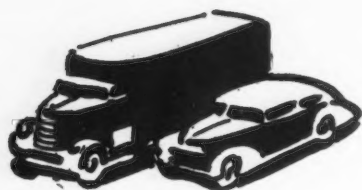
Worn and slippery floors may be slowing down production in your plant—wasting vital minutes. The danger of accidents that injure trained personnel can be reduced with "A.W." Rolled Steel Floor Plate. Used on factory and power plant floors, catwalks around machinery, stair treads, runways, fire escapes. "A.W." Floor Plate is oil-proof, heat-proof, fire-proof, crack-proof. Easy to clean, quick to drain. No maintenance expense. Made in five patterns. The Super-Diamond Pattern is shown here. Write for illustrated folder today.

"A.W." Rolled Steel FLOOR PLATE

ALAN WOOD STEEL CO., CONSHOHOCKEN, PA.
District Offices and Representatives—Philadelphia, New York,
Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver,
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St. Paul, St. Louis, Los Angeles, San Francisco, Seattle, Montreal.

Assembly Line

• Auto executives get proposed monthly output quotas . . . December figure to be fixed by Sept. 15 . . . SAE answers claim that automotive industry chews up very large amounts of defense materials.



DETROIT—In the hands of automobile executives for study is the proposed monthly setup on passenger car production for all of the current fiscal year, beginning Aug. 1, 1941. These figures, prepared on a company-by-company basis, tentatively establish quotas that will eventually bring monthly automobile output to approximately one-third of recent monthly levels.

So far as can be determined, suppliers are still uninformed about these quotas, largely because the figures are admittedly subject to adjustment as conditions require. Only August, September, October and November quotas are actually firm ones.

Within four days, however, the automobile industry advisory committee again will meet in Washington to consider the proposed schedule and reach some agreement regarding the December quota. This decision is scheduled to be made by Sept. 15.

Published herewith for the first time is the tentative schedule.

These figures for passenger cars include station wagons, but separate quotas will be established for trucks with unlimited production and A-3 priority already announced for trucks above one and one-half ton capacity.

A comparison of these tentative schedules with output for the corresponding months in the previous two model years is made in the accompanying chart.

AUGUST production, which was nearly complete when the quotas for the first four months were released to the automobile manufacturers on Aug. 21, was in about 158,700 units (passenger cars and trucks). A breakdown of of these production figures shows about 105,000 passenger cars. The difference between actual output and scheduled output is supposed to be split about evenly between the months of September, October and November and will affect the quotas accordingly. After the first of December each company will be expected to stay within its quota month by month.

The Society of Automotive Engineers has rigged up a spotlight and telescope, so to speak, to make an interesting examination of the allegation sometimes voiced that the automobile industry uses very large quantities of essential defense materials. In view of the inferences that the automobile industry's production of cars and trucks represents a serious drain on critical or strategic material, figures published in the *SAE Journal* are worthy of a second look. This SAE study leads to the conclusion that some quantity—small in most cases—of "critical metals is essential to adequate safety, life and performance of cars and trucks" but this percentage is shown to amount to, at most, less than 2¾ per cent of available supply.

Tentative Monthly Set-up on Passenger Car Production for Fiscal Year Beginning August 1, 1941

August	111,429	
September	235,124	
October	235,124	
November	235,124	
Total for four months		816,801
December	204,455	
January	204,455	
February	173,788	
March	173,788	
Total for four months		756,484
April	173,789	
May	143,118	
June	133,917	
July	122,977	
Total for four months		573,501
Total for year		2,146,786

Assuming that automobile production would be cut only 20 per cent (accepted assumption just a few weeks ago) SAE cited the following examples:

ALUMINUM, secondary, needed for both killed and rimming deep drawn steel. In 1942 automobiles' (as designed at present) requirements would amount to only 1.44 per cent of anticipated available supply in the period from July, 1941, to July, 1942.

COPPER, required for radiator water tubes and upper and lower tanks. Requirements would amount to approximately 2.7 per cent of the copper available in the 1941-1942 period.

NICKEL, essential for most exhaust valves. Only 0.036 per cent of the 1941-1942 supply would be needed to supply all valve requirements.

CHROMIUM, also an essential for valves would represent a drain of only 0.16 per cent of the supply available during the period in question.

CHROMIUM, as an essential for gears, axles, steering parts and other functional steel parts, now that nickel is out of the picture. Less than 0.8 per cent of the available supply would be needed for these functional parts.

ZINC, required for carburetor and fuel pump bodies which are die cast parts. Less than one per cent of the available supply would be consumed.

Some **NICKEL** also is required for spark plug wires, distributor wires, distributor springs, compensating shunts for voltage regulators, heating elements, and bi-metal elements of electrical indicators. The requirements are less than 0.25 per cent of the available supply between July 1941-July 1942.

MAKING the assumption of a 50 per cent cut in automobile production (which agrees with the facts as they stand today) a much smaller percentage of the available 1941-1942 supplies will be required. These are as follows: secondary aluminum for deep drawing parts—approximately 0.9 per cent; copper for radiators—approximately 1.7 per cent; nickel for valves less than 0.023 per cent; chromium for valves—less than 1.0 per cent; chromium for gears,

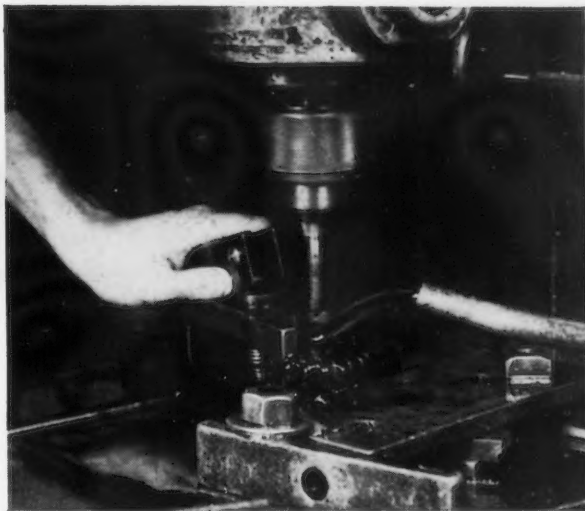
Make Your Taps LAST LONGER!

The right lubrication helps. It will give faster production, better size control and smoother threads, too. Here are a few tips.

First: Use plenty of lubricant. Put it where it will do the most good. Force it into the hole parallel with the axis of the tap if you can — use two streams on horizontal tapping. For deep tapping and finer pitches, use light or diluted oil to insure reaching the point of the tool. Be sure it's flowing when the tap starts to cut. This helps wash out the chips, too.

Second: Keep the lubricant clean. When it becomes dirty or gritty, replace it with new, clean lubricant.

Third: — and very important, different materials require different lubricants for most efficient tapping. Your oil company's lubrication engineer will give you specific advice, but here are some useful general hints.



This is one of a series of advertisements published by Greenfield Tap and Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

SUGGESTED TAPPING LUBRICANTS

Material Being Tapped	Lubricant
Allegheny Metal.....	Sulphur Base Oil
Aluminum.....	Kerosene & Lard Oil
Bakelite.....	Dry
Brass.....	Compound or Light Base Oil
Bronze.....	Compound or Light Base Oil
Bronze—Manganese.....	Light Base Oil
Copper.....	Light Base Oil
Die Castings—Aluminum.....	Kerosene & Lard Oil
—Zinc.....	Compound
Duralumin.....	Compound or Kerosene & Lard Oil
Fiber.....	Dry
Iron—Cast.....	Dry or Compound
—Malleable.....	Compound or Sulphur Base Oil
Monel Metal.....	Sulphur Base Oil or Kerosene & Lard Oil

Material Being Tapped	Lubricant
Nickel Silver.....	Sulphur Base Oil or Kerosene & Lard Oil
Rubber Hard.....	Dry
Cast.....	Sulphur Base Oil
Chromium.....	Sulphur Base Oil
Machinery.....	Compound or Sulphur Base Oil or Kerosene & Paraffin
Manganese.....	Compound or Sulphur Base Oil or Kerosene & Paraffin
Steel Molybdenum.....	Sulphur Base Oil
Nickel.....	Sulphur Base Oil
Stainless.....	Sulphur Base Oil
Tool.....	Sulphur Base Oil or Kerosene & Lard Oil
Tungsten.....	Sulphur Base Oil
Vanadium.....	Sulphur Base Oil

GREENFIELD TAP AND DIE CORPORATION GREENFIELD, MASSACHUSETTS

DETROIT PLANT: 2102 West Fort St.

WAREHOUSES in New York, Chicago and Los Angeles

In Canada:

GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.



GREENFIELD

TAPS • DIES • GAGES • TWIST DRILLS • REAMERS • SCREW PLATES • PIPE TOOLS



Photo by Harris & Ewing

LIQUID-COOLED ALLISONS: In this General Motors Allison division plant at Indianapolis, Ind., Allison liquid-cooled aviation engines are being turned out for use in Curtiss P-40, Bell Aircobra, Lockheed interceptors, and the North American Apache and Mustang fighting planes. The picture shows a cylinder machining operation.

axles and steering parts and other functional parts—less than 0.5 per cent; zinc for dies cast carburetor and fuel pump bodies—less than 0.62 per cent; nickel for electrical systems—less than 0.16 per cent.

Adding up all the requirements for nickel and chromium shows that the total possible demand from the automotive industry is relatively unimportant as a drain on defense. Combining nickel requirements for valves and electrical systems shows possible demand for only 0.286 per cent of available supplies with a 20 per cent automobile cut and 1.83 per cent if auto production is cut 50 per cent. Chromium, also listed twice, once for valves and once for functional parts, would total only 0.96 per cent if the 20 per cent cut were in effect and 0.60

per cent if the 50 per cent cut in production is effected.

It will be observed that there has been no claim put forward for materials of this nature for plating, trim or other admitted non-essentials.

SAE also calls attention to the fact that roller and ball bearings are made of case-hardening molybdenum-nickel steels or through-hardening chromium-steels. Alloys for these materials are regarded as essential. Other parts listed as essential are the die cast main control valve body for one of the automatic transmissions. This is now made of a die cast aluminum alloy and would be difficult to replace with any other material because of machining difficulty, etc. Another special critical part is the nickel alloy tube passing through the ex-

haust manifold which connects to the automatic choke on one line of cars, according to SAE.

IN its announcement of new models, Plymouth is playing down the term "1942 models" and instead is identifying the new cars as "Plymouth's Finest". This attitude on the part of the sales and advertising department is a reflection of the times. The industry is not at all sure whether these new models being introduced this fall will be "two-year models" or "two-month" models. Basically the designs will have to be continued without change until the emergency is over, but appearance and perhaps some of the mechanical details will be changed from time to time as necessity requires. For instance, the bright metal trim is going to disappear in late fall, according to present schedules. It is possible that revisions every few months will result in quite a different car by the end of this model year for many manufacturers.

As predicted, Plymouth has a larger, slower speed and more powerful engine. A power output of 95 hp. is claimed for the engine at 3400 r.p.m.

Transportation of goods and materials is playing an increasingly important role in the defense program, as is attested by the many reports of critical situations in which transportation or materials-handling problems play a leading role. The problems range from those incident to inter-plant shipment in cases where subcontracting is a new factor to be reckoned with, to the national oil and gasoline transport problem and even to the major task of handling lend-lease shipments to Britain, China, Greece, Africa, Russia, etc. These pressing problems have caused considerable attention to be focused on a coordinated system of packaging and transport proposed by the Transport Co-Ordinator Co., Detroit, which has designs for accordion-type containers (wood or metal) which are equipped with hydraulic driving mechanisms and casters, plus attachments for hanging from overhead conveyors.

These units are designed so they could be rolled from the plant floor to the shipping platform, thence on to trucks or railroad flatcars, where

(CONTINUED ON PAGE 112)

The Growing Preference for Oilgear Equipped Machines

It's a matter of factual record that machines which have been equipped with Oilgear Fluid Power meet with exceptional user acceptance everywhere. Many machine tool manufacturers who have standardized on Oilgear Equipment for the past 10 to 17 years write, that today, more than ever before, the Oilgear Systems on their machines give them a powerful selling leverage. Moreover, several manufacturers have turned their sidelines into headliners by equipping them with Oilgear.

There are a host of reasons why. From the standpoint of the user, Oilgear Fluid Power gives the operator faster and more accurate control; it gives the machine the extra speed and reserves of power needed to carry today's heavy production load; and Oilgear minimizes those "times out" for maintenance and repair which slice the peaks off production curves. Output and more output is the word today, and Oilgear powers up machines to give their very maximum.

Then, from the standpoint of the manufacturer, Oilgear means a power problem solved; it means a greater measure of dependability and greater protection to the manufacturer's and the user's reputation.

Before you buy Fluid Power Equipment, look into Oilgear Fluid Power. Get the whole story. With all the facts right at hand, you'll see why the swiftly growing preference for Oilgear equipped machines and machine tools. Use the coupon below for complete details. **THE OILGEAR COMPANY, 1309 W. Bruce St., Milwaukee, Wis.**

Feeds • Pumps • Cylinders • Valves • Motors • Transmissions
Horizontal and Vertical Broaching Machines • Horizontal and
Vertical Presses • Custom Built Machines



Baldwin Southwark 4000 ton Forming Press. Equipped with Oilgear 100 H.P. Two-Way Variable Displacement Pumps.

25,000

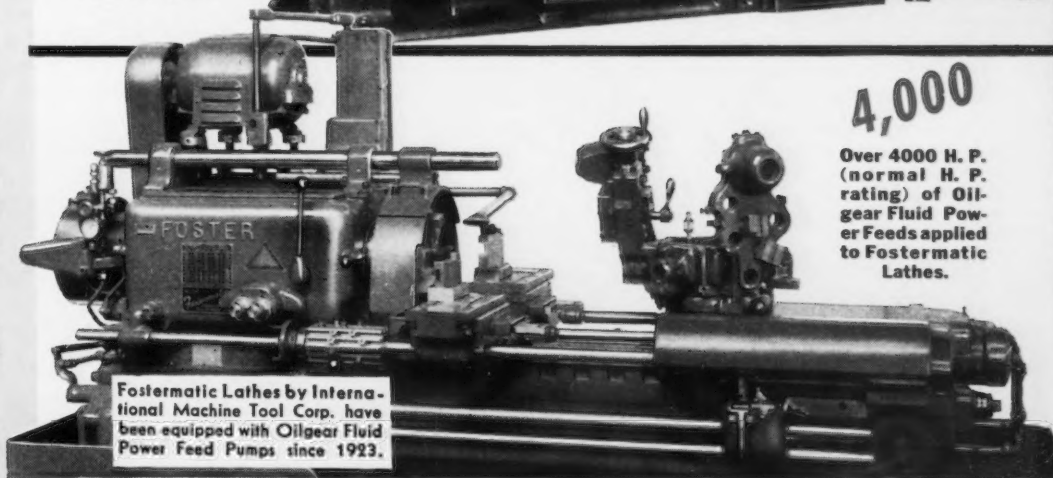
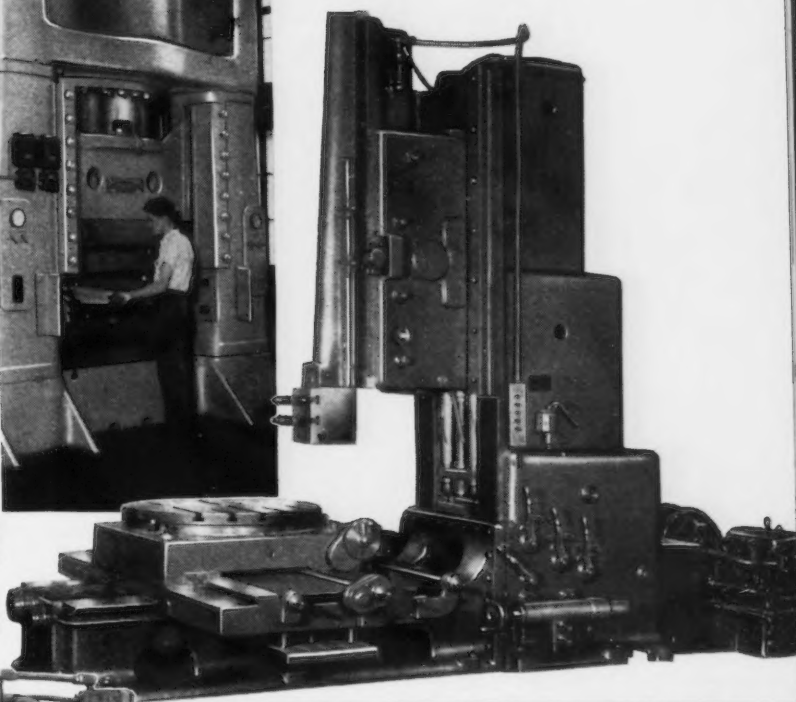
Over 25,000 H.P. (normal H.P. rating) of Oilgear Fluid Power Units put on presses of 6 leading domestic press manufacturers.

17 leading press manufacturers as well as other smaller ones now use Oilgear Fluid Power Equipment.

Rockford Machine Tool Company "Hy-Draulic" Vertical Slotter. Uses Oilgear Variable Displacement Pump, Combination Valve and Cylinder.

9,000

Over 9,000 H.P. (normal H.P. rating) of Oilgear Fluid Power Units put on Rockford Planers and Slotters.



4,000

Over 4000 H.P. (normal H.P. rating) of Oilgear Fluid Power Feeds applied to Fostermatic Lathes.

Fostermatic Lathes by International Machine Tool Corp. have been equipped with Oilgear Fluid Power Feed Pumps since 1923.

THE OILGEAR COMPANY, 1309 W. Bruce Street, Milwaukee, Wisconsin
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Washington . . .

• Doubters find new 7-man defense board without a directing head but Nelson may become its active leader . . . Steel industry up to its neck with work under PD-73.



WASHINGTON—There are doubters who still insist that defense production will never attain top efficiency until the entire defense program is organized under a single head as was the old War Industries Board.

Nevertheless, the prevailing spirit here is to give the new seven-man Supply Priorities and Allocations Board a full chance to live up to its advance advertising "to hasten direct action along lines where action is needed." This view exists even though it is mixed with some skepticism that sees tongues put into cheeks and fingers crossed because the board is dominated by four blown-in-the-bottle New Dealers, three of whom certainly have no qualifications for their job. At the same time it is the hope that they will leave its performance to abler men in the defense organization. There is particular expectancy, if nothing more, for instance, that Vice-President Henry A. Wallace really won't be active as chairman of the board, except possibly doing so infrequently as a matter of front. Obviously Mr. Wallace knows nothing of the duties to which he has been assigned—on paper at least.

Consequently it is the hope that there is truth to reports that Donald M. Nelson, SPAB Executive Director, will be active head of the board. This would go a long way toward offsetting unfavorable reaction to putting on the board such

unqualified men as Mr. Wallace, Harry L. Hopkins and Sidney Hillman.

In any event comfort is found in the selection of Mr. Nelson to perform one of the most responsible tasks in organization. Being a man of great ability, courage and conviction much faith is being placed in him as director of priorities. Internal differences together with necessary rapidity of action have created a tangled situation respecting priorities. There are some big snarls to be straightened out.

IN its initial statement, SPAB gave recognition to the need to do something quickly and constructively about priorities so it may be expected that Mr. Nelson will grapple with the problem at once. The board warned that speeding of all-out defense means tough going for "less essential industry." By "less essential industry" the board stated that it means those industrial activities involving use of materials and production facilities which sap supplies and machinery resources necessary to a realistic all-out defense program. Defense comes first, it was pointed out, and while recognizing that the civilian economy must be stripped of non-essentials, the board said that it must be kept in good running order and in more than standby condition.

"To achieve this purpose," said the announcement, "the board will devise appropriate controls to assure equitable distribution of materials under a constructive system of priorities, the basic purpose of which is to assure the wisest use of all our resources for the task at hand."

If this course is pursued there will be relief not only for worried essential civilian industries but also for the steel industry as both a key defense industry and a civilian producer though its role in the latter capacity is rapidly diminishing. The relief to the steel industry will come chiefly through a breaking down of concentration of defense tonnages that have been piling up tremendously on mills.

AT present the industry is up to its chin with work under PD-73, the OPM mandatory priority form which really is a source for studies on current and unfilled steel business, both defense and non-de-

fense, the former rising and the latter declining swiftly. Some companies report close to 50 per cent of the backlog is already substantiated by this form with which some consumers apparently are not yet sufficiently familiar.

Complaint is made that there is need for partial weeding out of A-1-a and A-1-b ratings. They are held responsible for an unbalance that nullifies some of the higher ratings and make useless some ratings such as A-5. There is uncertainty also, it is indicated by reports coming to Washington, regarding the order in which to take care of ship material, plates for cars and other lines for which exists heavy pressure for rolling. Seeking the highest production possible mills are said to be interrupted frequently by orders to switch schedules which calls for changes of rolls and other steps that cause delays and loss of tonnage.

There is said to be evidence that this situation is clearing up somewhat. An outstanding difficulty, however, is the determination of tonnages that should be given precedence when there are so many higher ratings, each of which must be rolled "first." At the same time there are lower ratings which also are important but which cannot be scheduled and the sequence of directions maintained in the steel order.

Another contention is that some defense material is over-scheduled and delivered ahead of time while other defense consumers are left short of steel. This is said to be especially true of plates.

THE priority steel order is expected to eliminate some backlog tonnage that is said to have been duplicated, yet this will not solve the problem since much of the backlog will carry defense rating. The result is that non-rated tonnage will get no recognition in such products as plates, heavy sheets, structurals, bars and some pipe sizes. Even other material, it has been pointed out, will be difficult to obtain because of British requirements for semifinished tonnage that takes raw material which otherwise would go to finishing mills that frequently have to curtail operations.

As has been said repeatedly much of the trouble is a matter that re-

MAKE **SUNOCO** YOUR PARTNER *in* PRODUCTION

Take a Step Toward Setting a HIGHER

P-Q*

Production . . . and still greater production . . . with no limit on quantity
—no let-up in quality . . . that's the order of the day!

And leading manufacturers are relying on the high lubricating and heat-absorbing qualities of Sunoco Emulsifying Cutting Oil to help their hard-pressed machine tools meet this demand. They know how Sunoco rapidly dissipates the heat . . . carries away chips . . . permits faster removal of metal . . . helps to prolong tool life and cuts "down time" for tool regrinding and resetting. They know, too, how Sunoco aids in maintaining close tolerances . . . improving finishes . . . and reducing rejects. This makes possible precision production at rated capacity-plus . . . and permits the setting of a higher Production Quota (P-Q*).

Put Sunoco to the test in your own plant, under your own operating conditions. See how labor, equipment and the right cutting lubricant, all working for maximum efficiency, make possible the setting of a new, higher P-Q*. Write or wire:

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SUNOCO

EMULSIFYING
CUTTING OIL

PERFORMANCE DATA

OPERATION—Taper Turn
Locomotive Frame Bolt
MACHINE—Warner and
Swasey 1-A Universal
Turret Lathe
MATERIAL—S.A.E. 3140 Steel
SPINDLE SPEED—398 R.P.M.
CUTTING SPEED—208 S.F.P.M.
FEED—.020 inch
DEPTH OF CUT—1/8 inch to
1/4 inch
CUTTING LUBRICANT—1 part
Sunoco to 20 parts water
Photo Courtesy of
THE WARNER & SWASEY CO.



PETROLEUM PRODUCTS FOR ALL INDUSTRIES

Copyright 1941 by Sun Oil Company

quires readjustment of timing in arranging priorities, allocation to mills on the basis of capacity to produce and placing material on schedules that round out rollings without putting too much emphasis on ratings that are subordinate to higher priorities.

In the rush there will continue to be difficulties and the situation may be stated more easily than it can be solved. But confidence is felt in the industry that if SPAB proceeds under Mr. Nelson in the direction it has mapped it will do a great deal to untangle the web and stimulate output to the advantage of both defense and essential requirements.

East to Aid Stettinius In Lend-Lease Work

Washington

• • • John D. East, who has been technical assistant to the OPM Director of Priorities, has taken up his new duties as assistant to Lend-Lease Administrator Edward R. Stettinius, Jr.

Price Control Sticks Despite Name Change

Washington

• • • To remove any uncertainty that may exist regarding the effect of the Presidential order setting up the Supply Priorities and Allocation in connection with the reorganization of defense agencies, Leon Henderson has announced that all prices issued by the former OPACS remain in full force and effect regardless of the change of its name.

"The Executive Order," Mr. Henderson said, "merely provides that the title of Office of Price Administration and Civilian Supply shall be changed to Office of Price Administration. It does not affect in any way the powers of the agency in regard to price control. Consequently all price ceiling schedules issued and all other action taken by this agency under the prior name remain fully effective under our new name."

Warehouses Given A-9 Priority Rating

Washington

• • • Mill purchases by steel warehouses are given a priority rating of A-9 and at the same time quotas on such purchases are to be established for each warehouse, according to the terms of order No. M-21-b issued Sept. 4 by OPM priorities division. The A-9 preference rating will apply only to purchases made within the quota.

In announcing the plan to give priority treatment to steel warehouses for obtaining stocks for resale, Donald M. Nelson, director of priorities, said that OPM regards steel warehouses as constituting the normal source of supply for small civilian orders.

Copies of reporting form PD-83-a, which calls for reports on deliveries during the first quarter of 1941 of steel from stocks owned and on consignment, have been mailed out to approximately 3000 warehouses. The completed form is to be filed with the priorities division on or before Sept. 15.

These reports will be used as the basis for determining the percentage of first-quarter sales to be fixed as the quota for delivery to the warehouse during the fourth quarter. Each warehouse will be notified on or before Oct. 5 of its quota as determined by OPM, and quotas established for the last quarter will remain in effect for each subsequent quarter until further notice.

Under the A-9 rating assigned, deliveries of all types of steel to a warehouse are permitted to the extent of one-third of its receipts from mills of such types of steel during the first quarter of 1941.

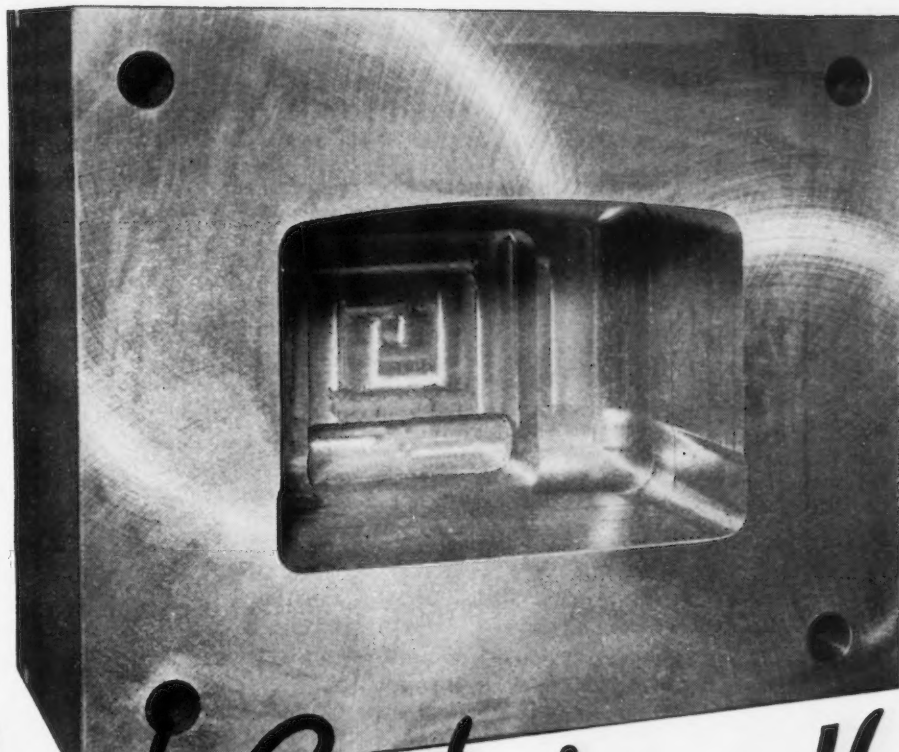
The order limits deliveries of steel from warehouses. For example warehouses, except for small sales in amounts specified in the order, may not make deliveries of alloy steel for any but defense orders.

Permitted exemptions allow monthly deliveries of alloy steel on small non-defense orders up to 10 per cent of the average monthly deliveries of such material during the first quarter. The order defines "small orders" as covering materials in the following amounts—alloy tool steel, 50 lb. per item; stainless steel, 50 lb. per item; and other alloy steel, 300 lb. per order.

THE BULL OF THE WOODS

BY J. R. WILLIAMS





Cost Cut in Half

$\frac{1}{16}$ " stock is ground from all outside surfaces of this 18" x 22" x 11" die on a Blanchard No. 18 Surface Grinder at **half the previous cost.**



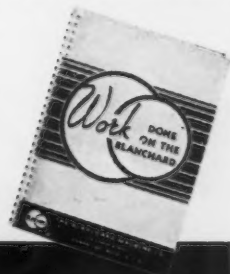
Blanchard No. 18 Surface Grinder

Costs are vital in peacetime — production is vital for defense work — accuracy is always important. Blanchard Grinders meet these requirements — shops that have Blanchards can be sure of machining their flat surface work accurately, rapidly, and at lowest cost.

For most work no tooling is required, set-up time is a matter of minutes, and there is practically no lost time between jobs. The quantity of varied work that can be profitably machined on a No. 18 Blanchard Grinder is a revelation to those not familiar with this machine.

If you are interested in speeding production and cutting cost of machining flat surfaces, send us prints or samples of your work for production estimates.

This booklet, "Work Done on the Blanchard," shows over 100 jobs with production data. Send for your copy today!



THE BLANCHARD MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASSACHUSETTS, U. S. A.

WEST COAST . . .

• Farm implement makers on Coast warming up for game of musical chairs, dashing from steel mill to steel mill in search of deliveries . . . Exhibits at Fair reveal substitutes.



San Francisco

CALIFORNIA FARMERS, and some farmers in other parts of the West Coast, long have sworn by implements built in Coast shops and factories and sworn at many implements thrust Coastward by manufacturers in other areas.

This preference is not accounted for entirely by provincial prejudice, but results instead, from unusually heavy soils, steeply sloping fields and a wide variety of crops peculiar to this section of the country.

So varied is the implement demand as between crops and localities that a good sized farm equipment manufacturing industry exists among a few small factories and many country machine shops. No single manufacturer accounts for more than a very small portion of the total volume.

Engineering is mostly of the cut-and-try type and material requirements, though flexible, are with the exception of alloy steels, rolled in Pacific Coast mills. Local demand centers on light angles, channels, and various merchant mill products. Castings come from local foundries.

These specialized Coast implement makers now typify that group of manufacturers of all sorts who have been granted preference ratings insufficient to enable them to maintain their vital place in the national economy. Deliveries of ma-

terials to be used in the manufacture of new farm equipment take the highest civilian rating, B-1, and materials for repair parts take an A-10 defense rating. Neither rating is of substantial value in obtaining deliveries from Western mills for many months, probably not before it is too late to commence manufacture for the 1942 crop season. The impact of large defense contracts on a small steel capacity has been too great. Possibly some of this rolled steel can or could be obtained from Eastern mills instead of usual sources of supply, but it is doubtful whether these small manufacturers, individually, have the scouting facilities to find this steel, or could place sufficient tonnage to warrant direct mill booking. Local jobbers will be of some help, but naturally demonstrate some reluctance to drain their stocks.

ONE SMALL manufacturer who has developed a line of Western implements over a period of 20 years normally has a monthly demand of from 60 to 150 tons of steel bars and shapes, castings, tubing, plates and harrow disk blades. With remarkable foresight, he placed orders months ago for requirements of his 1941-42 manufacturing schedule. Deliveries were good until the announcement of General Preference Order M-21, which resulted in the balance of these orders being displaced indefinitely from rolling schedules. Shortly thereafter, his castings supplier announced that deliveries would be stopped unless he could obtain a defense rating.

This Hard Luck Story No. 777 may or may not have a moral, as you choose. It might be used to prove that manufacturers of similar types of equipment located in different sections of the country are affected differently by the same preference rating. This could be substantiated by pointing to the more numerous sources of steel supply east of the Mississippi. Or, the story might serve to demonstrate the need for insuring more forcefully that the Coast gets the tools necessary to raise fruits and vegetables for Britain. At this point, inquiry might be made into the logic of granting makers of canning machinery a high defense

rating and makers of farm machinery only a civilian rating . . . but that is a question for the technicians. Possibly some means has been worked out for getting food into cans before it is raised.

A definite implication of this manufacturer's case is that many, many small manufacturers with low priority status are going to have to play a game of musical chairs, dashing from mill to mill to find the one at which their rating gives them the most prompt delivery, if, indeed, it insures acceptance anywhere. May the quickest and most resourceful man get there first and know when he's well off.

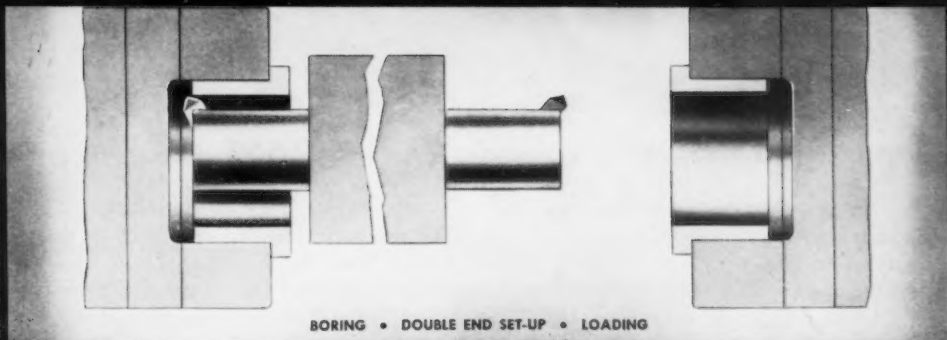
The California State Fair's implement exhibit last week showed clearly the effect material shortages have had and will have in the next few months. Orchard spray rigs again carry the wood tanks that were universal 20 years ago instead of steel sheet tanks which have come into popularity in the last decade. Pump manufacturers, exhausting their stock of stainless steel, are substituting carbon steel shafts with the frank admission to prospective customers that shaft life will be cut down. A small California manufacturer of a roller mulcher, which formerly was hung on a frame built of angle and channel steel, now suspends the roll from a sheet steel canopy reinforced at the bearing points. The substitution not only solves a material shortage, but gives the implement a streamlined appearance. The flexibility is affected adversely, however.

DIESEL CRAWLER TRACTORS, long associated with the big implements and heavy soils of California agriculture, were few. Caterpillar Tractor Co., the largest manufacturer of tractors of this type, had only three on display, two of which were brought in out of fields where they had been in use. Allis-Chalmers showed only one, and International Harvester Co. managed to scare up three in the smaller sizes. Crawler tractors now being manufactured are going to defense construction projects.

Investigation into the availability of old tractors and implements as a possible source of scrap steel supply for far western mills gives little encouragement under the present



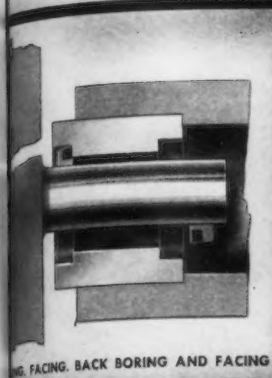
RECESSING



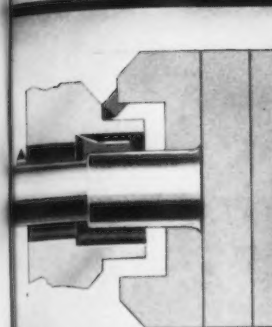
BORING • DOUBLE END SET-UP • LOADING



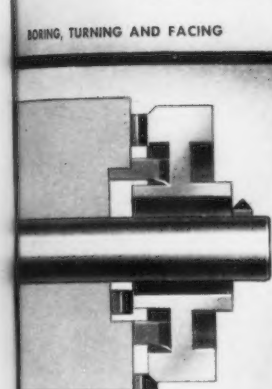
TAPER BORING



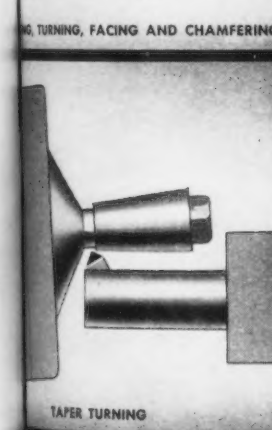
BORING, FACING, BACK BORING AND FACING



BORING, TURNING AND FACING



TURNING, FACING AND CHAMFERING



TAPER TURNING



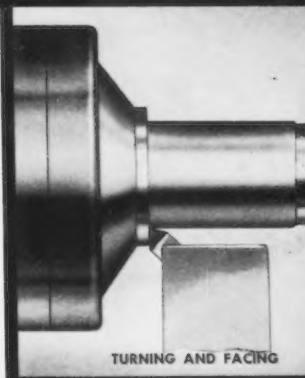
Illustrated here is a combined operation on an Ex-Cell-O Precision Boring Machine (Style 1212-A—Junior Double End) with an Ex-Cell-O Universal Fixture. Job is boring, facing, turning and chamfering brass aircraft gyro part with extremely close tolerances and on a production basis. Inspection has been minimized and other costs substantially reduced.

*I*N MACHINING interchangeable parts, there are varied possibilities to an Ex-Cell-O Precision Boring Machine. Not only will it rough and finish bore holes—straight, taper, blind, interrupted—but it will also turn, face, chamfer, groove, with almost any combination accomplished at the one time. Some of these single and combined operations are indicated by the surrounding sketches. And every Ex-Cell-O Boring Machine is a Precision Machine, with exclusive Ex-Cell-O features of design and construction that assure the greatest production of uniform work to the closest possible limits in size and finish. These Ex-Cell-O Precision Boring Machines (there are five standard styles) are enabling many manufacturers to meet successfully the unparalleled demand for defense items.

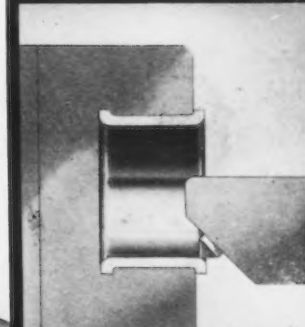
EX-CELL-O CORPORATION • DETROIT, MICH.

EX-CELL-O
Precision

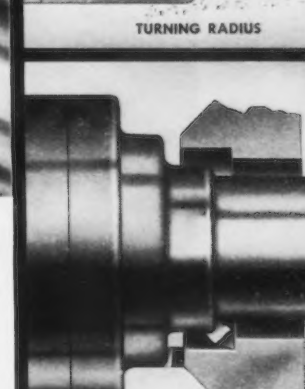
**MACHINES
AND TOOLS**



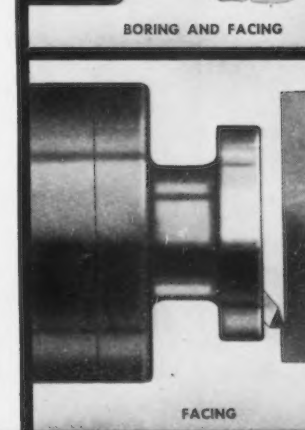
TURNING AND FACING



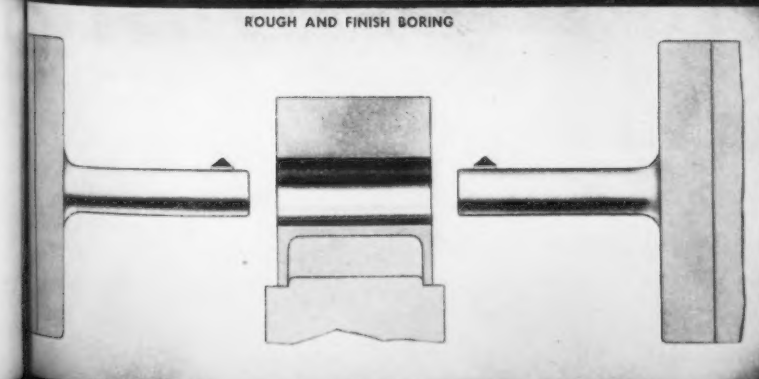
TURNING RADIUS



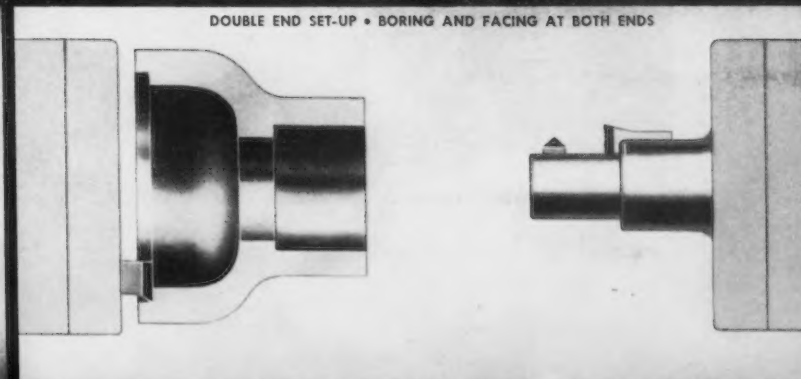
BORING AND FACING



FACING



ROUGH AND FINISH BORING



DOUBLE END SET-UP • BORING AND FACING AT BOTH ENDS

price schedules. Old tractors and implements are abundant in the rich agricultural hinterland of the Pacific Coast, and their owners—farm implement dealers and farmers—are willing enough to sell them at junk prices. Substantial dealer support is evident for any plan which will take old implements out of use and create a better markets situation for new tools after the defense pinch is over. One obstacle to the collection of agricultural scrap lies in its wide dispersion, which alone makes it unattractive to junk men at present

prices. A second barrier to its utilization lies in the almost universal practice of scrap dealers of purchasing through automobile wreckers. (Approximately 75 per cent of Pacific Coast scrap is automotive.) Farm implement dealers naturally are not over-anxious to have used tractor and implement parts in the hands of auto wreckers to sabotage the market, and hence the preparation of such scrap presents a problem. The chief reason why this scrap source has not been tapped, however, lies in the long freight haul to consumption points.

The OPA maximum price schedule was not tailored to the long distances of the far west and freight charges are too large to be absorbed by dealers selling to tide-water mills at frozen prices. Further revision of price schedules taking into account allowances for freight hauls in the collection process might materially increase the scrap supply. Anyone who doubts the availability of agricultural scrap in the hinterland need only investigate the origin of large tonnages exported to the Japanese before exports were banned.

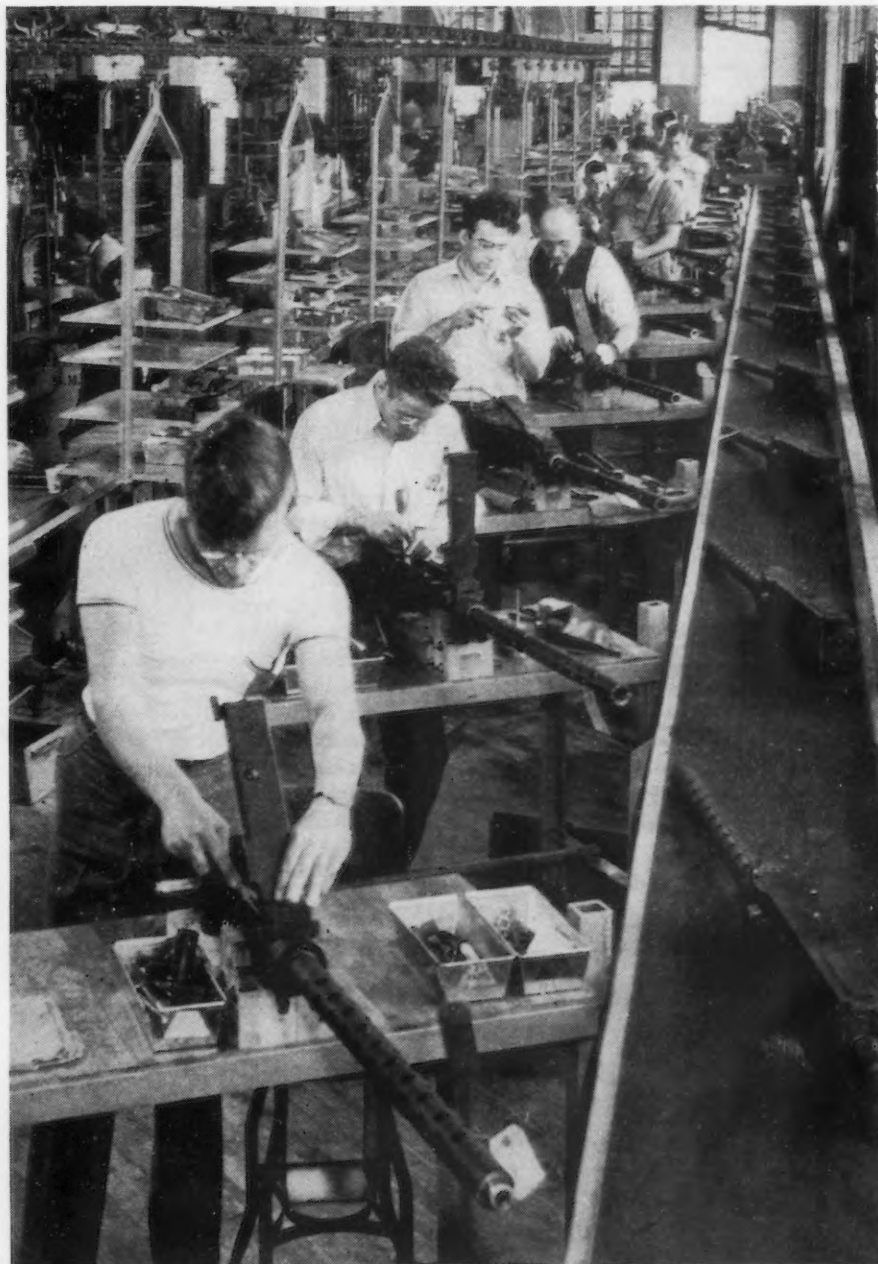
It would be foolish to say that the official scrap price schedule has been followed to the letter on the Coast any more than in other parts of the country, but it has at least furnished a lid to the market, even though there has been some boiling over around the edges. "Upgrading," to borrow a term from personnel administrators, has been most prevalent in foundry grades, it is reported.

Tonnage and grade of iron ore deposits at the Iron Chief Mine in the Eagle Mountains of Riverside County, California, will become a matter of official record upon completion of expensive drillings by United States Bureau of Mines which commenced last week. Surface explorations have indicated that these deposits contain from 40,000,000 to 70,000,000 tons of magnetite, with some hematite, ore, running from 6 to 67 per cent Fe, but no extensive subsurface exploration heretofore has been made. If surface indications are borne out by present Bureau of Mines drilling, which will take about a year, the ore could be reduced either by blast furnaces using Utah coke, or by an electric furnace operation using petroleum coke and Boulder Dam power, the price of which has been recently lowered.

Award of a \$176,316,690 plane contract, presumably for Flying Fortress bombers, to the Douglas Aircraft Co. was announced last week. The new contract boosts the Douglas backlog to \$649,001,896. In Seattle last week contracts were awarded for the manufacture of 252 steering engines for Maritime Commission ships to the Western-Brinkley Co. Contract price was \$200,250,000. Sixty more of the engines will be manufactured by the Sumner Iron Works, Everett, Wash.

MACHINE GUNS FOR THE ARMY: Here, at the General Motors AC Spark Plug Division, Flint, Mich., is shown the final assembly operation on 0.50 cal. machine guns being produced on Army defense orders.

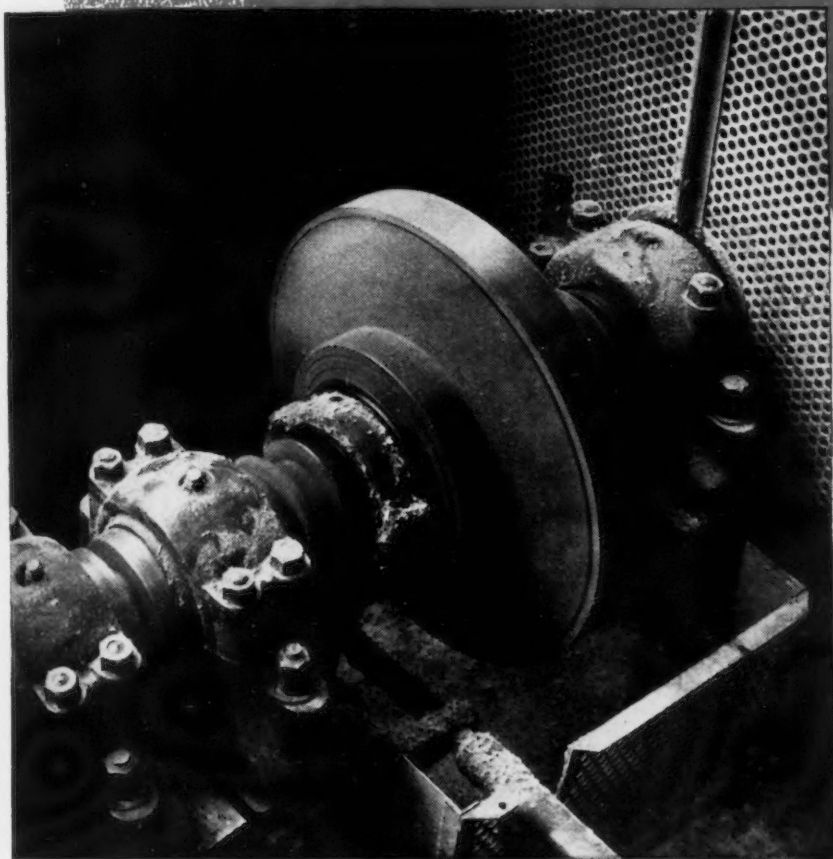
Photo by Harris & Ewing



You Pay the Same for Power - - Delivered or Dissipated!

Speed and Stamina

... NO. 1 SPECIFICATIONS
TODAY...



**BUT DODGE KNOWS
YOU WILL WANT THEM
TOMORROW, TOO!**

Your choice of Dodge Diamond "D" Friction Clutches for speed and stamina equal to today's heavy loads will stand you in good stead tomorrow — when needs return to normal.

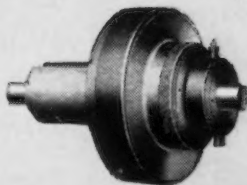
Built the Dodge way — Dodge Clutches are longer lasting because they are perfectly balanced — completely enclosed against destructive dirt — compact and self-locking — with an ample safety factor that permits momentary starting loads 100 per cent higher than normal rating.

For power transmission or machine application — Dodge Clutches deserve your preference.

DODGE MANUFACTURING CORPORATION
MISHAWAKA, INDIANA, U.S.A.

DODGE DIAMOND "D" FRICTION CLUTCHES ... Preferred FOR THESE FEATURES:

- **Powerful** — ample safety factor to handle momentary overloads as high as 100 per cent above rating.
- **Compact** — designed for extreme compactness without sacrificing horsepower capacity.
- **Protected** — fully enclosed against destructive dirt and dust and for added safety.



- **High Speed** — proper proportioning and accurate balance for continuous high speed operation.
- **Simple Adjustment** — positive, convenient one-point adjustment.
- **Smooth Operation** — self-locking feature eliminates necessity for pressure to hold clutch in engagement.

DODGE
MISHAWAKA
Power Transmission

THE RIGHT DRIVE

... FOR EVERY JOB

Fatigue Cracks

BY A. H. DIX ■ ■ ■

Timid Toot on Our Bugle

• • • Like a distiller's daughter at a W.C.T.U. meeting, we can hardly discuss the virtues of advertising without hearing whispers of axes to grind. Therefore, we will keep our biased viewpoint to ourself and simply air what a friend of ours, a small manufacturer of a non-ferrous metal product, told us last Sunday afternoon while the charcoal was warming up the hotdogs in the backyard:

"Congratulate me. The Colonel called me up last night and told me that I have been awarded that defense order I've been after. It will keep me busy for at least a year. Came just in time, too, as I couldn't get materials and would have had to close down.

But what's worrying me is that my old customers will forget me in the meantime. Even though I can't take a nickel's worth of business, I'm going to keep my two salesmen calling on the trade right along. And although I have never advertised before, I'm going to start now. I have to. Can't afford to risk having to start from scratch when this thing is over."

That bright and favorable impression you have today of a given product, unless continually renewed, will fade like a skywriter's message just after he rounds off the "a" in Pepsi-Cola. It looks to us as if a heavier burden than ever before is going to be placed on advertising's shoulders to keep you from saying "Wonder what became of the so-and-so outfit."

What The Doctor Really Said

• • • Our item last week about Dr. Munyon mentioned his slogan as something like "Dr. Munyon will cure you." But George R. Woods sets us right. It was "There is hope." Much obliged, Geo. Now we remember.

One Talker, Three Recorders

• • • Speaking of colonels, we recently availed ourself of an invitation extended the Fourth Estate's sharecroppers to examine a nearby Quartermaster Depot. Goggle-eyed, we walked past acres of uniforms, G.I. cans, canned goods, mess kits and shoes.

What impressed us most was that the welcoming address, made by a Q.M. big shot from Washington, was recorded not by one stenographer, but by two, with a Stenotype operator added for safety's sake. The precaution seemed unnecessary, as the talk was safe and had obviously been given many times before. The only statement we heard that might be considered dangerous is that the Army is better fed than 60 per cent of the civilian population and that when the soldiers return to peacetime pursuits they will demand better food. This has a faintly subversive ring.

Our second impression was that the place was simply lousy with majors. We can remember when a major was something special, like the punchboard number that wins the box of candy, but in the Depot (*deppo* is what the Colonel called it; accent on the first syllable) almost everyone we saw had at least a gold maple leaf. The clerical staff, inspectors, and handlers are practically all civilians. The only enlisted men we saw were high ranking non-coms.

It seemed to us an ideal spot to use drafted men who are otherwise rejected for nearsightedness, flat feet, or bad teeth. Enlisted men do the Q.M. work at the camps, and there is probably a good reason why civilians are engaged at the depots, but we thought we'd just mention it.

The whole place had about it an air of good house-keeping, and although we snooped around as much as we were permitted, we found no one sleeping on a bale of tents. Everyone seemed busy and there was a refreshing absence of military etiquette. Come to think of it, we didn't see a single salute.

Soothsayers Sing Soft

• • • Ben Corrado of the brains department unearthed this skeleton in the Mar. 20, 1930, issue, while doing some grave digging the other day:

Bottom of Depression Reached

Dr. Chas. O. Hardy says . . . the current depression . . . is a temporary maladjustment of the type we experienced in 1924 . . .

One of the saddest spectacles of this decade is the timidity of the business forecasters. Their disinclination to project their neck beyond the collar line is pitiful, and their fear of extrapolating a trend line beyond the immediate future amounts almost to a phobia.

We look longingly back to the days when you would no more question a pronouncement of what would happen when X curve crossed Y than you would a prophecy of what will happen when a spoonful of Bromo Seltzer meets a glass of water.

The Goliath that is intimidating the business seers is *If*, the unpredictable factor. A new David is needed. We hope he will prove to be M.I.T.'s Prof. Paul A. Samuelson, who we see has received an award to make—steady now—a theoretical and statistical analysis of macrodynamic business cycle theories.

Weight Off Our Mind

• • • Thanks to Miss Lavinia McKenzie and H. J. (Canada Foundries & Forgings, Ltd.) Rolland, we no longer have to flinch when anyone talks troy weight, as Bill ("The Assembly Line," see page 68) did recently. He said indium sells for \$12 a troy ounce. We would have guessed that a troy ounce, being used to weigh the semi-precious materials, would weigh less than an avoirdupois ounce. But that's where we were wrong. The troy ounce weighs more, 480 grains against the avoirdupois ounce's 437.5.

If you can bring the conversation around to a discussion of relative weights, you can win money on this.

Dilly Dallied

Dilly isn't a West Coast exclusive. It has been pretty much of a standard word in the Midwest and is commonly used to describe such diverse subjects as Elmer Riddle's fast-breaking curve, a well-made weld, a 300-yd. screamer down the middle, the attractive redhead at the switchboard of that Rockford plant, a complicated die, or Joe Louis' left hook.

—Herman Klein, *The Iron Age* Chicago editor

Although a new joke travels across the country with the speed of light, slang is slow. *Dilly* has dallied overlong. It is a complete stranger to the conservative Atlantic Seaboard, which still relies upon the well-worn *knockout*, *honey*, *wow*, and *lulu* to express supreme admiration.

Puzzles

• • • If last week's coins don't come up heads and tails 150 times, both heads 75 times, and both tails 75 times, you have violated the law of averages. Robert T. (Pittsburgh Tool Steel Wire Co.) Griffiths said he knew how they would turn out without flipping them.

W. C. (Wheeling Steel) Marshall gives us the other correct answer to the flagpole problem. It is 11.282 ft. E. L. Kahn and G. G. Scott hit the first answer on the nose, 49.21 ft.

Don't touch this one, sent in by A. W. (Youngstown Steel Tank) Kelly, if the thermometer is over 80:

A river 10 miles wide flows due south at the rate of 5 miles per hour. A man on the west bank wishes to reach a point on the east bank 2 miles farther south in the shortest possible time. He starts out in a motor boat that can do 15 mph in still water, but runs out of gas when he reaches midstream. He abandons ship and swims the remainder of the trip. If he can swim 3 mph in still water, in what direction should he have started?



A 48" dia. x 60" deep Cyclone Furnace in service in the Aluminum and Magnesium Heat Treating Department at Lindberg Steel Treating Co., Chicago, Illinois

ALUMINUM AND MAGNESIUM HEAT TREATMENT is no problem TODAY . . .

**BECAUSE PRACTICAL STEEL TREATERS WORKED
FAR INTO THE NIGHT SEVEN YEARS AGO . . .**

ORIGINALLY DEVELOPED for production tempering of steel parts in a commercial steel treating plant, the laboratory accuracy of the Cyclone Heating Principle was by no means a happy accident. The first Cyclone produced was operated for a year in the Lindberg Steel Treating plant before it was announced. The result was a heating principle which has successively solved the problems of steel tempering, low temperature heating and annealing, and brass annealing, in hundreds of plants. The inherent accuracy of the principle fitted it ideally for the extreme heating uniformity required in aluminum and magnesium heat

treatment . . . and today hundreds of Cyclones are in service in aircraft plants, accessory plants, and aluminum and magnesium foundrys.

If you have contracts for heat treating work which will have to stand up against 100% inspection, whether it be for steel or non-ferrous heating, then check on the Cyclone. Your local Lindberg office can show you installations on almost any type of work.

LINDBERG ENGINEERING COMPANY

2452 W. HUBBARD ST. CHICAGO, ILLINOIS

This Industrial Week . . .

METAL producers and consumers this week kept their eyes for the most part on the center ring of the national defense circus but had time for an occasional glance at the end rings where important, if less dramatic, acts were unfolding.

The controversy as to whether SPAB, the new Supply, Priorities and Allocation Board, headed by Donald Nelson, will do the job in mobilizing industry for defense that was done by the War Industries Board during the last war was, of course, the main show of the week.

To hundreds of plants wrestling with material shortages and to many others who fear they must face the same problem later on, how the SPAB will function and precisely what steps it will take to speed defense production is of greatest significance. Bernard M. Baruch, head of the War Industries Board in the last war, who told newspapermen at Washington that organization of the new super board was only a "faltering step," explained to THE IRON AGE that those two words, used alone, do not accurately describe his attitude toward the new board. He believes, he said, that "creation of the new

It's All Up To Donald Nelson

board is an advance which does not go far enough." To Mr. Baruch and to many other industrial and government leaders, the next step in building a powerful war board, exerting strong control over industry and labor, seemed up to Donald Nelson, former Sears-Roebuck official, who is executive director of SPAB.

During discussions as to reorganization of the top U. S. defense agencies to stimulate a program which still hardly supports this country's reputation for industrial mass production, Nelson already had taken a step which cheered small metal-working plants, particularly those without representatives at Washington. Thousands of applications for preference ratings, including many sent to Washington by manufacturers of metal prod-

ucts, suddenly brought answers. In many cases the senders, trying to get or keep their plants in production on vitally needed defense equipment, had been waiting for weeks. Nelson had taken his OPM priorities division staff, brought in a force from private industry of persons expert in handling mail and paper work and toiled overtime for several nights in a general cleanup of preference rating applications.

To further speed the priority system, Mr. Nelson and his assistants devised a plan where the preference application forms themselves

Letters Must Be Answered

became preference certificates merely by the use of a special stamp and the signing of Nelson's name. This end-ring act by the new head of SPAB accompanied a statement by him that: "When a business man files an application or sends us an inquiry he deserves an answer." Which, industry believes, is fair enough.

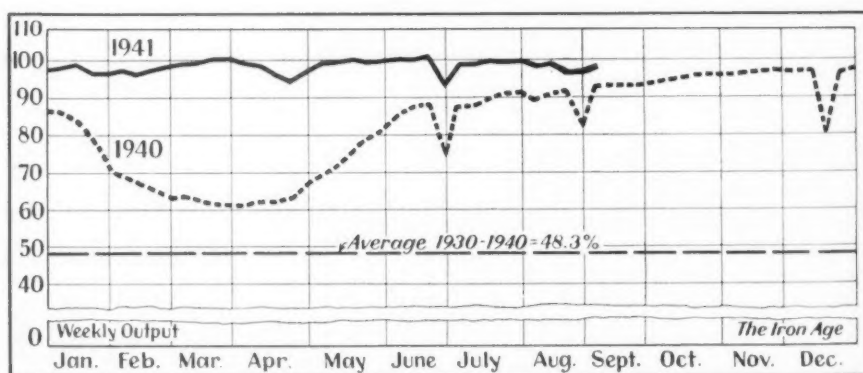
Almost immediately new problems for SPAB added themselves to old problems long waiting for solution. Among the new prob-

lems was the fate of the proposed 1820-mile defense pipe line. Rear Admiral Land, Maritime Commission chairman, said: "If steel for the pipe line is going to come from Navy ships and my ships, I'm against it." President J. J. Pelley, of the Association of American Railroads, pointed out that the "shortage" can be averted by use of 20,000 surplus tank cars. The Navy Department wants the pipe line project passed up and additional tankers built.

Another step to spread defense work, a move which had seen much talk but little action for more than a year, was taken this week when President Roosevelt appointed Floyd B. Odum, New York investment company executive, to head the newly organized OPM Division of Contract Distribution. After his appointment, Mr. Odum remarked that "high cost producers have their place in the present all-out effort, just as the large factory uses its less efficient machines or a public utility system pulls out its old and standby equipment to tide over peak loads." The executive order establishing the new division gives Mr. Odum a mandate to make the old Defense Contract Service, whose records, personnel and experience he inherits, a more effective aid to small business.

Urgency of the need for widen-

Steel Ingot Production—Per Cent of Capacity
(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pitts-	Chi-	Val-	Phila-	Cleve-	Buf-	Wheel-	De-	South-	S.Ohio	West-	St.	East-	Aggre-
	burgh	cago	leys	delphia	land	falo	ing	troit	ern	River	ern	Louis	ern	gate
Current Week . . .	100.0	101.0	96.0	91.0	96.0	104.5	91.0	112.5	96.5	98.0	99.0	108.0	110.0	97.5
Previous Week . . .	96.0	101.0	96.0	91.5	93.0	103.0	90.0	99.0	96.5	93.0	100.0	108.0	94.0	96.5

CORRECTIONS BY BARUCH: Pencil corrections in the manuscript of an IRON AGE article setting forth Bernard M. Baruch's views on defense mobilization of the U. S. are shown here in Mr. Baruch's handwriting. The article itself appears on page 85.

need for ship plates.

This is not the principal difficulty. The principal difficulty may lie in the coordination of activities.

To each man, one disquieting difference between the old War Industries Board, which drew praise from many war leaders (including Von Hindenburg), and SPB is the lack, as far as the public knows, of a definition of authority for each of the seven men on the new board.

The War Industries Board was a team whose duties were outlined. Each man had specified responsibilities. They were chosen from particular groups, and their

ing of defense contracting is again illustrated in the latest U. S. Chamber of Commerce survey showing that nine out of ten of 6000 manu-

Carriers Face Rail Shortage

facturers reporting believe that unless unforeseen circumstances change the situation, they soon will be forced to reduce operations drastically because of shortages of raw materials and equipment. Likelihood of the nation's railroads obtaining the balance of their 1941 rails as well as 1942 requirements at anywhere near the time needed grows fainter each day as rail mills become weighed down with structural shapes, munitions steel, semi-finished steel for Great Britain and rails for defense use. Steel companies with rail mills are exerting themselves to supply rails to the carriers but their hands are tied by the steel priority order which makes it mandatory that defense orders be filled first.

The flow of incoming business to steel mills in the past week contracted somewhat, with nearly all producers noting a decline in the volume of new specifications. In the light of the great defense backlogs, this tapering has little significance. With a lack of scrap and pig iron continuing to bar still higher steel output, operations rose a point this week to 97½ per cent. This compares with 96.5 per cent last week and 97 per cent in the pre-holiday week.

Sharply increased rolling of semi-finished steel for export lifted production of iron and steel products in July 24 per cent over the June

total, according to the American Iron and Steel Institute. Production for export in July totaled 430,493 tons, compared with 327,357 tons in June, the gain being due chiefly to a jump in output for export of ingots, blooms, billets, slabs, etc., to 169,575 tons. The institute's figures show that, as yet, conversion of sheet mills to plate production has not had any notable effect upon the rate of sheet production. Meanwhile, steel ingot production in August set a new high for that month at 7,000,957 net tons, or 95.7 per cent of capacity, according to the American Iron and Steel Institute. August output represented a gain of 179,275 tons over July production of 6,821,682 tons.

On last Tuesday pig iron producers received their long awaited September pig iron schedules which had been examined and revised by the OPM in accordance with the iron priority order. The entire September production of pig iron has been allocated and practically all the material is

Iron Schedules Finally Arrive

slated for shipment to consumers carrying a defense rating. In a small number of cases essential civilian requirements have been partly taken care of. As expected, the entire pool of 2 per cent, the amount which each producer is to lay aside during September, has also been allocated, most of it going to non-integrated steel companies short of pig iron and to foundries with heavy defense business. Considerable revision is said to have

been done on some of these pig iron schedules, the OPM eliminating some shipments and adding others.

Already some controversy has appeared within the industry over the fact that some pig iron producers have been instructed to deliver iron to points distant from the point of production, necessitating substantial freight rate absorption.

Coke pig iron production in August reached a new high, totaling 4,791,432 net tons, compared with 4,770,778 tons in July, according to reports to THE IRON AGE. Output on a daily basis increased slightly from 153,896 tons

213 Furnaces Are Melting

a day in July to 154,562 tons in August. On Sept. 1 there were 213 furnaces in blast.

Fabricated structural steel awards of 19,850 tons this week are slightly lower than a week ago. The largest lettings are 11,600 tons at Marion, Okla., for an air depot for the War Department, 2500 tons for eight cranes for the Navy Department at various locations and 1200 tons for an assembly building for the Lockheed Aircraft Corp. at Burbank, Cal. New structural steel projects declined to 20,100 tons from 25,750 tons last week. New jobs reported include 12,000 tons for Boeing Aircraft buildings at Renton, Wash. Reinforcing steel awards of 53,35 tons are swelled by 36,000 tons for Navy defense construction on Pacific islands. New reinforcing projects amount to only 2135 tons.

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News of Industry

• • •

U. S. Should "Ration With Reason," Baruch Tells the Iron Age

By JAMES A. ROWAN
News and Markets Editor

• • • Bernard M. Baruch's prescription for victory for the United States in the Second World War is a dose which industry would find bitter but effective.

It calls for utmost emphasis on defense with all classes concentrating on the manufacture of defense goods production and through that production the destruction of the enemy.

Government, industry and labor politics would be shelved, as far as this is possible, until the war is over. All wages, rents, and prices would be ceilinged. Organized labor and industry would take no step to better their positions relative to each other except after a thorough investigation by a price control committee.

No non-defense company should be choked out of existence arbitrarily because of lack of raw materials. It would be represented through industry committees (this is already being done) which would present each case to the defense agencies. "Rationing with Reason" should be a fixed government policy.

Industrialists and political leaders who have been carrying "business as usual" banners should, Mr. Baruch told THE IRON AGE, be placed so far out of sight that when peace comes they will not



• • • Bernard M. Baruch

yet have reached the reviewing stand.

To most of the industrialists who followed his leadership when he was chairman of the U. S. War Industries Board in the First World War, Mr. Baruch's ideas on all-out mobilization of the country for defense comprise a Master Plan to which the country is only too slowly turning. Signs that the Baruch plan has finally reached the top of the pile in Washington came only last week when President Roosevelt appointed a seven-man Super Board (Supplies Priorities and Allocation Board).

Is the President's board, SPAB, headed by Vice President Wallace as chairman, and Donald Nelson, executive director, a new War Industries Board? How will it work?

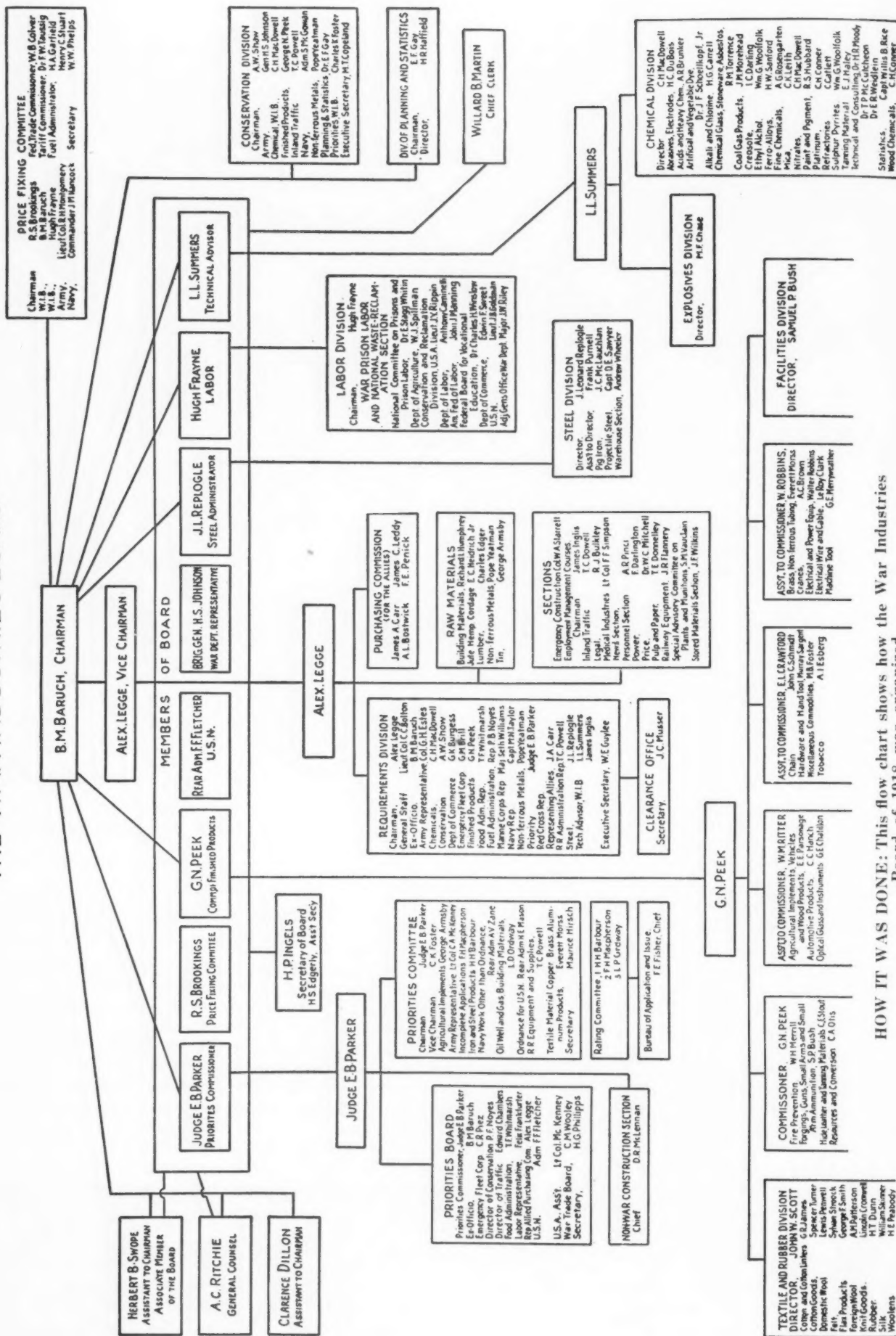
Setting up of a new OPM Division of Contract Distribution, un-

der Floyd Odlum, to spread defense work to the growing number of plants which are threatened with shutdowns over inability to obtain materials, is, Mr. Baruch believes, a wise move and follows our war experience. Whether the new Super Board will be the final answer to the nation's needs for coordinating defense production will not be known for some time, but will depend on the board itself and particularly upon Mr. Nelson. The members all have a keen understanding of the problem.

Some of the War Industry Board's friends acknowledge that SPAB has a skin-deep resemblance to the War Industries board, but a weak heart and stomach and no head. They hope it will develop into a strong successor. Many believe it will.

One of the really strong, able

THE WAR INDUSTRIES BOARD



HOW IT WAS DONE: This flow chart shows how the War Industries Board of 1918 was organized.

*From "American Industry In the War,"
courtesy of Prentice-Hall.*

men on the new Super Board is intelligent and tough minded enough to emerge as the actual leader of SPAB but is weakened by an affliction which makes him see every employer as a crook. One or two other potentially strong men on the new board sincerely believe that the war can be won with "Business as Usual" and so, in the privately expressed opinions of the "W.I.B. Men," automatically make themselves unfit for the job.

The new Supplies, Priorities and Allocations Board members and their assistants have an opportunity for making a record for themselves like that of the War Industries Board whose members, Woodrow Wilson said: "Turned aside from every private interest of their own and diverted the whole of their trained capacity to the task that supplied the services of the whole great undertaking."

Mr. Baruch himself, in his position as an elder statesman and as a patriot who can view objectively the disputes that are slowing the defense program, is unwilling to analyze the problems except for the ears of those immediately involved. He would not hesitate to speak plainly to the President nor would he talk softly if a few loud words would open the eyes of a steel company chairman to the country's danger as Mr. Baruch sees it.

To the former chairman of the War Industries Board, the initial step in the establishment of a strong organization is the creation of the right atmosphere. The key men in the organization, whether it is intended to arm Germany, the United States or any other country, must have complete authority and responsibility for their actions. They must have the courage to say "No" or, when necessary, to shout it.

In the First World War, one War Industries Board aide was forced to shout "No" to Charles M. Schwab when the urbane head of the Bethlehem Steel Co. at that time sought to have five tons of plates rolled on his own mills for a water tank to be erected on his estate at Loretto, Pa. Mr. Schwab's complaint about the steel plate subsided when he was reminded of the urgent need for ship plates.

One disquieting difference between the old War Industries



Photo by Associated Press

DEFENSE BOARD: 1941—Here are the members of the new Supplies, Priorities and Allocation Board, appointed by President Roosevelt to lift to maximum efficiency the national defense program. Left to right, seated, are Harry Hopkins, William S. Knudsen, OPM director-general; Vice-President Wallace, chairman, and Donald Nelson, executive director. Standing are James V. Forrestal, Navy undersecretary, representing Secretary Stimson; Leon Henderson, OPA chief, and Sidney Hillman, Associate OPM director.

Board, which drew praise from many war leaders (including Von Hindenburg), and SPAB is the lack, as far as the public knows, of a definition of authority for each of the seven men on the new board. The principal difference may lie in lack of coordinating authority.

The War Industries Board was a team whose duties were outlined. Each man had specified responsibilities and none were chosen to represent some particular group, class or party. The steel and other industries sent some of their strong men to Washington to work with the War Industries Board and its various departments. There were plenty of would-be war profiteers in Washington but their activities, as far as the War Industries Board was concerned, were sharply curtailed.

Mr. Baruch, who this week discussed with this magazine some of the perplexing problems which industry and defense agency leaders face, said that the differences between government leaders and leaders of industry and labor must, however unpalatable, be swallowed, but he does not believe that as long as labor works for

private industry engaged in making profits, it (labor) can be denied the right to strike. That would be involuntary servitude which the constitution prohibits. Their quarrels, where the safety of the United States is threatened, must end.

Mr. Baruch who is said to have had more experience in industrial mobilization than any other man told THE IRON AGE that his present opinions on this subject are best outlined in a letter he wrote to President Wilson at the close of the First World War. Here, in part, is what Mr. Baruch wrote:

"The mobilization of America's industrial forces and their conversion from peace and construction to war and destruction was a gigantic task and responded to in a gigantic manner. Its value in the final outcome rates second only to the mobilization of the nation's man power and in that enterprise, the War Industries Board, which commanded, under you, the forces of industry, was likewise of aid by indicating those trades from which the workers could be more readily spared than from others, the continuation of which were essential to the war's development.

"The problem confronting the War Industries Board was vast and complex and the difficulties were added to in that it was not possible to set a program of fixed limitations which could be worked up to, and having been achieved, the task completed.

"The needs of the Army and the Navy and the other agencies of our country and our associates changed and expanded overnight. It was no part of our work to make the program; our duty was to help execute it by supplying the materials that made success attainable. To be able to do this; to know what we had to do and plan to do it; to coordinate and synchronize the multiplicity of national and international efforts and make them effective to supply the war demands so that our armies and navies could discharge their formula of fighting and winning, the War Industries Board evolved a general formula which is herewith appended because it shows what the board was and what it tried to do. It read:

"Wars are fought and won—or lost—on the land, in the sea, in the air and on those battle lines behind the front where the civilian forces stand. It is not enough to mobilize the nation's military strength. There must be a mobilization of her full economic resources—industrial, agricultural and financial. These must be organized, coordinated, and directed with the same strategy that governs the operations of the purely military arms of service.

"The prodigious strain upon the world's production capacity must be met and balanced to provide the means of warfare and to maintain the civilian population as well as to preserve the economic fabric.

"America today is the chief source of strength to the forces engaged in the conflict against German world domination. That strength is expressed in terms of power and material—the one military and the second industrial.

"To control and regulate industry in its direct and indirect relations to the war and the nation, the President has created the War Industries Board and placed the responsibility for its operations in the hands of the chairman.

"The War Industries Board is charged with the duty of procuring an adequate flow of materials for the two great war-making agencies of the government—the War and Navy departments—and for the two agencies in immediate affiliation with these military arms—the Emergency Fleet Corp. and the Railroad Administration. Also, the board provides supplies necessary to the military needs of our associates in the war, and those commodities required by neutrals in exchange for materials essential to us.

"Finally, and of paramount importance, the board, in alliance with the Food, Fuel and Labor Administrations, provides for the country's civilian needs, the protection of which is a particular duty of the organization.

"It is not only the duty of the War Industries Board to stimulate and expand production in those industries making war essentials, it is equally the Board's duty to protect, so far as may be, those industries not immediately essential to the war program.

"It is the policy of the board, where retrenchment and curtailment is necessary, to keep alive, even though it be necessary to skeletonize, the enterprises in this group and not destroy them. Whenever possible, conversion of industries from a non-war production to an essential output is affected.

"The War Industries Board is a method of control devised by the President to equalize the strain placed upon the American industrial structure by the war. It stimulates and expands the production of those materials essential to the war program and at the same time it depresses and curtails the production of those things not of necessitous nature. This is done by regulation, in consonance with other executive branches, of the basic economic elements: (a) Facilities, (b) materials, (c) fuel, (d) transportation, (e) labor, and (f) capital.

"The method of control is through a preference list, on which are placed those industries whose output is essential to the war's progress. The priority indicated by the preference list is the master key to the six elements named.

"Further, the board regulates and controls certain other industries of first-rate war importance, it fixes prices through the price fixing committee, it creates new and converts old facilities, it clears the national business requirements, and it leads to conservation, which is needed to bridge the gap between the extraordinary demand and the available supply—a gap which exists in almost all of the great commercial staples.

"The War Industries Board embraces all and each of the nation. Food and fuel are separately administered, but with every other article of military need and of ordinary life the board has a direct connection, and it has a basic relationship with food and fuel too, for both require in production and distribution the materials that the War Industries Board provides. Its strength lies in the full and patriotic cooperation that American business, including both the employers and the employees, gives on working out the problem common to us all.

"The abnormal conditions of the war demand sacrifices. It is the price of victory. Only actual needs, not fancied wants, should and can be satisfied.

"To save heavy and long privation, temporary deprivation must be the rule.

"America's willingness to accept these conditions marks her ability to quicken the end of the conflict."

Today, as in 1918, the principles set forth in this War Industry Board formula can be used to win the war, Mr. Baruch told THE IRON AGE.

Canada Makes Record In 1941 Steel Output

Toronto

••• Due to the blowing out of one blast furnace in the latter part of July, leaving eight stacks out of a total of 10 in blast, Canada's pig iron production for the month showed a decline from June, while output of steel gained. Pig iron, ferro-alloys and steel production figures for the first seven months of this year made new records for Canada.



HOWITZER PILE: Among the hundreds of different war materials now streaming across the sea from Canada are these howitzer shells which are produced in one of the largest plants of its kind in the British Empire.

o o o

CIO SIT-DOWN: CIO members of the Ford Motor Co. Detroit local staged a sit-down strike during the Labor Day parade "just in fun." This type of strike, used on a large scale in 1936, was outlawed by the U. S. Supreme Court in 1939.

Photo by Wide World



Photo by British-Combine

QUADRUPLE LEWIS GUN: Four Lewis guns on a single mounting make a formidable weapon for a variety of uses, especially against aircraft.



Photo by British-Combine

DROGUE: In schools throughout Canada, young men from the Dominion and other Empire countries are learning to become air gunners. Here the gunner's target is a drogue (sleeve target) towed by another plane.

Open Hearths Using More Outside Scrap; Trend to Continue

By T. C. CAMPBELL
Pittsburgh Resident Editor

Pittsburgh

• • • The amount of scrap which must be furnished for open hearth furnaces in the United States during the balance of this year probably will be somewhat greater than is now anticipated. This assumption appears to be amply illustrated in an analysis of scrap and pig iron consumption by open hearth furnaces in the United States during the first six months of 1941. The analysis made by THE IRON AGE and going back to 1937 is based upon source material gathered by the United States Bureau of Mines.

During the years 1937, 1938, 1939 and 1940 a definite trend toward a lower percentage of scrap in the total open hearth charge was clearly indicated. In 1937 total scrap consumed by open hearth furnaces in the United States was 51 per cent of the total charge but by 1940 had dropped to 46 per cent. However, figures covering the first six months of 1941 show an abrupt and significant reversal in this trend by in-

dicating a scrap consumption of 49 per cent of the total open hearth charge or a gain of 3 points over the average 1940 consumption.

It is apparent from the statistics that the steady drop from 1938 to 1940 in the percentage of scrap used in the total open hearth charge was probably due to other factors besides the price of scrap and pig iron. It appears the steady increase in the percentage of pig iron used in the making of open hearth steel from 1939 to 1940 may have been partly an early indication of a growing scrap shortage, in addition to heavy scrap exports during that period. In other words, the pig iron was available because of the availability of ore and blast furnaces. However, by 1940, with the defense program starting, and with steel ingot production reaching new heights, open hearth superintendents apparently had reached a maximum point at which pig iron was available.

With open hearths using every bit of pig iron available during the first six months of 1941, the deficiency, because of the greater increase in steel ingot output, had to be made up by obtaining more scrap. Analysis of home scrap consumption, as related to the per cent of the total open hearth charge, indicates a relative stabilization from 1937 through the first

six months of 1941 and for that reason can be dismissed as a variable factor. It was more or less expected that home scrap (scrap produced within the company's operating open hearth furnaces) from a proportionate standpoint should not change much owing to the fact that scrap produced within steel companies usually has a fixed relation to total steel produced.

The statistics indicate that the deficiency in the amount of raw materials for open hearth production had to be made up by an increase in the flow of purchased scrap since steel companies were using to the limit of their ability available pig iron which, in itself, was not enough either to maintain the previous relationship between scrap and pig iron or to bring about a continuation of the downward trend in scrap consumption as related to the total charge.

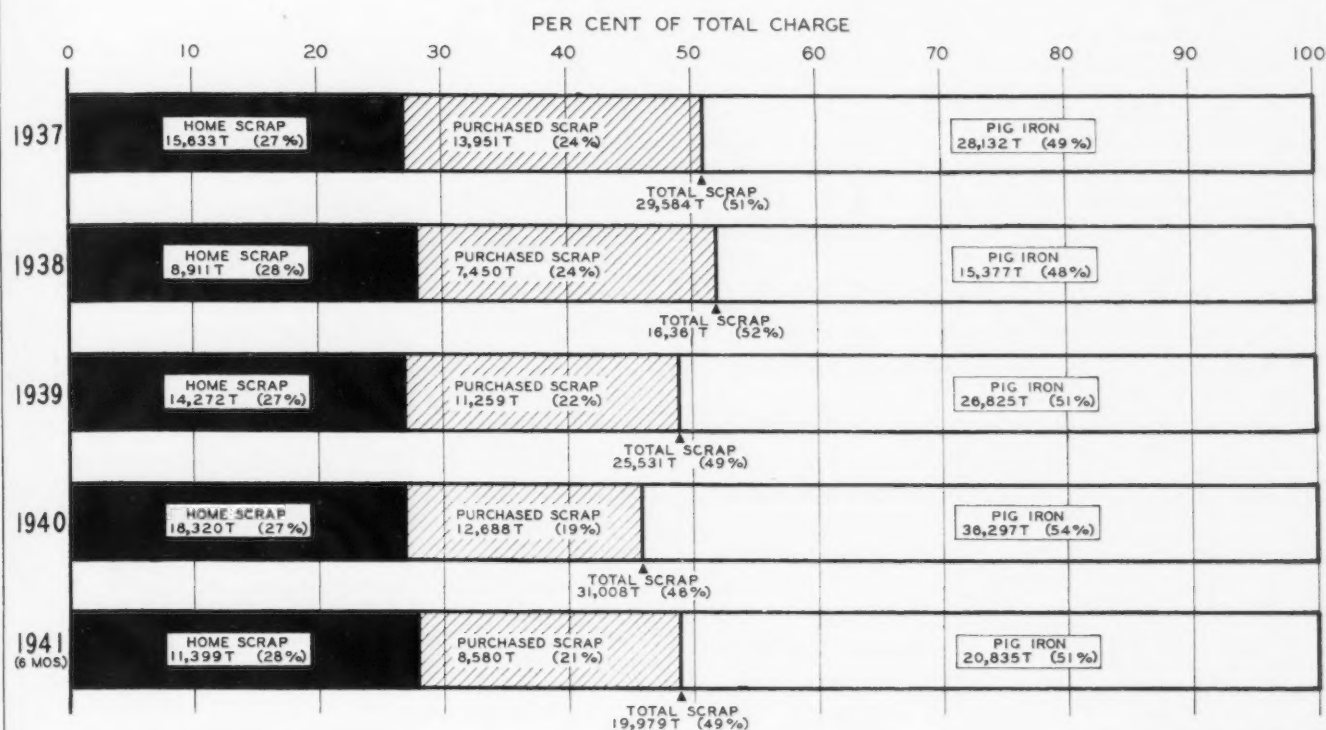
The striking conclusion from the analysis is that not only has the scrap industry been called upon to furnish a tremendous increase in scrap supplies because of the unprecedented production of open hearth steel, but has also been called upon during the first six months of this year to furnish a greater proportion of scrap to the total open hearth charge than was the case a year ago when steel production was not up to current

Consumption of Scrap and Pig Iron in Open Hearth Furnaces in the United States, in Thousands of Net Tons and in Per Cent of Total Charge

District	1941 (Six Months)				1940				1939				1938				1937			
	Scrap			Pig Iron	Scrap			Pig Iron	Scrap			Pig Iron	Scrap			Pig Iron	Scrap			Pig Iron
	Home	chased	Total		Home	chased	Total		Home	chased	Total		Home	chased	Total		Home	chased	Total	
New England:																				
Net Tons.....	65	109	174	71	74	184	259	94	55	197	252	66	32	135	167	32	57	231	288	52
% of Total Charge..	26	45	71	29	21	52	73	27	17	62	79	21	16	68	84	16	17	68	85	16
Middle Atlantic:																				
Net Tons.....	4,061	2,891	6,952	7,844	6,571	3,806	10,377	14,251	4,648	3,251	7,899	9,766	3,091	2,032	5,123	5,442	5,842	4,539	10,382	11,702
% of Total Charge..	27	20	47	53	27	15	42	58	26	18	44	56	29	19	48	52	26	21	47	53
Southeastern and Southwestern:																				
Net Tons.....	1,278	1,086	2,364	2,797	2,362	1,768	4,130	5,396	1,912	1,454	3,366	4,573	1,237	971	2,208	2,956	1,675	1,661	3,336	3,701
% of Total Charge..	25	21	46	54	25	18	43	57	24	18	42	58	24	19	43	57	24	23	47	53
North Central:																				
Net Tons.....	5,752	3,959	9,711	9,755	8,954	6,063	15,017	16,007	7,314	5,627	12,941	11,910	4,355	3,835	8,190	6,752	7,718	6,749	14,467	12,113
% of Total Charge..	30	20	50	50	29	20	49	51	29	23	52	48	29	26	55	45	29	25	54	46
Rocky Mountains and Pacific Coast:																				
Net Tons.....	243	535	778	368	359	867	1,226	550	343	730	1,073	510	196	477	673	195	340	771	1,111	404
% of Total Charge..	21	47	68	32	20	49	69	31	22	46	68	32	23	55	78	22	21	48	69	31
Total United States:																				
Net Tons.....	11,399	8,580	19,979	20,835	18,320	12,688	31,008	36,297	14,272	11,259	25,531	26,825	8,911	7,450	16,361	15,377	15,633	13,951	29,584	26,132
% of Total Charge..	28	21	49	51	27	19	46	54	27	22	49	51	28	24	52	48	27	24	51	48

Source of Material: U. S. Bureau of Mines.
New England district comprised of Conn., Mass., R. I.; Middle Atlantic of Del., N. J., N. Y., Pa.; Southeastern and Southwestern of Ala., Ga., Tenn., Okla., D. C., Ky., Md., W. Va.; North Central of Ill., Ind., Mich., Iowa, Mo., Minn., Wis., Ohio; Rocky Mountains and Pacific Coast of Colo., Cal., Wash.

CONSUMPTION OF SCRAP AND PIG IRON BY OPEN HEARTH FURNACES IN THE UNITED STATES IN NET TONS (000 OMITTED) AND IN PER CENT OF TOTAL OPEN HEARTH CHARGE



SOURCE: U. S. BUREAU OF MINES

THE IRON AGE

levels in comparative periods. The trend during the balance of 1941 is expected to continue upward as far as scrap consumed by open hearth furnaces is concerned and for that reason, figures for the full year of 1941 may show a proportion of scrap in the open hearth furnaces approximating the 52 per cent figure of 1938.

Other factors in the scrap-pig iron picture which are bound to have an influence on the availability of scrap or pig iron are summarized briefly: Steel ingots exported to Great Britain represent a loss of approximately 15 per cent of the total in the form of scrap which would have been cropped and used here if semi-finished products had been shipped; exporting of semi-finished steel which represents a loss of approximately 10 per cent scrap which ordinarily would have been recovered had finished products been shipped; the retarding effects of the scrap price ceilings in remote districts where the return to the scrap dealer is not enough to warrant gathering the scrap; the saturation

point in available pig iron supplies which already are reported to be about 5,000,000 tons short of 1941 requirements; the inability of many steel companies to build up sufficient scrap inventories to tide them over the winter months when weather conditions dictate the amount of scrap to be recovered.

Community Scrap Drive Planned at Youngstown

Youngstown

• • • Steel company officials, scrap dealers, and civic leaders are behind the county-wide drive for all available scrap that will soon be started here. Members of local political and social clubs are expected to locate and collect the scrap, while the scrap firms of Wilkoff Co., Mahoning Metal Market, Frank Sherman Co., and Kulka Iron and Metal Co. will grade and treat the metal without profit. The scrap will probably go to the furnaces of Youngstown Sheet & Tube, Republic Steel, and Carnegie-Illinois.

Reservations Are Heavy for Waste Material Convention

• • • Attendance for the Fall convention of the National Association of Waste Material Dealers, Inc., which will be held in San Francisco Oct. 11 to 14, are heavy, according to an announcement from the executive offices in New York. A greater part of the "City of San Francisco" streamline train leaving Chicago Oct. 8, has been reserved already, it was said.

Carpenters' Pay Lifted at New Ohio Ordnance Plant

Sandusky, Ohio

• • • Carpenters at the new Plum Brook Ordnance plant who struck for higher wages a month ago have been granted an increase of 12½c. an hour, bringing the hourly rate to \$1.25. Common laborers were granted a 5c. increase to 70c. Machinery for the manufacture of TNT and DNT arrived on Sept. 5 and is now being installed. The plant upon completion will be operated by the Trojan Powder Co.

August Ore Movement Breaks Lakes Record

Cleveland

••• With the August movement of lake ore establishing a new all-time record of 11,496,303 tons, it is expected that at least 79,000,000 tons will be brought down from the upper lakes during the current season, breaking the previous standing record of 66,902,778 tons for 1916 by 12,000,000 tons. At present 292 American ships and about 15 Canadian carriers are engaged in the ore trade but it is expected that some Dominion boats will go back to the transportation of grain in order to relieve the growing grain tightness in Canada. Were it not for this development and the fact that ore boats are returning to the upper lakes loaded with coal, thereby cutting down their speed, an even higher tonnage of ore might be shipped this year.

There is difficulty so far as storage space in this area is concerned, which may be serious in a few months.

Next year the present ore fleet will be augmented by five new ships now being built for the Pittsburgh Steamship Co., a subsidiary of the U. S. Steel Corp., permitting the carriage of an estimated additional 2,500,000 tons during the 1942 season. Plans for expansion of the furnace capacity of this area, it is felt, may require the construction of the 25 additional vessels recently recommended by defense authorities.

Mystic Ships "A" Group Only

Boston

••• Shipments by the Mystic Iron Works are 100 per cent on priority orders of "A" classification. The "B" group is practically out of the supply picture at the moment, but will receive iron as soon as the "A's" are filled up for September.

ACF Makes 3 Tanks Daily

St. Charles, Mo.

••• Production of three M-3 tanks per day has been reached by American Car & Foundry Co. plant here. More than 100 are reported to have already been delivered to Rock Island arsenal.

Ore Shipments to Buffalo Set Record

Buffalo

••• Operating at top speed to supply national defense needs, Great Lakes ore vessels carried more iron ore into Buffalo harbor during August than during any other single month in nearly 25 years, marine interests report. A total of 101 ore boats docked here during the month, surpassing the May, 1941, record by one vessel. The August movement, totaling in excess of 1,000,000 tons, brought the season's ore shipments here to about 4,400,000 tons.

Wellsville Nears 1929 Tempo

Wellsville, N. Y.

••• This town of 6000 is rapidly reaching a tempo in business conditions comparing favorably with 1929. Sinclair Refining Co., the main enterprise here, is operating at full tilt while direct and indirect defense needs are being supplied by the Moore Turbine Co., division of Worthington Pump Co., which is working on Navy and Maritime orders, and by the Air Pre-Heater Co. which is also supplying material for defense purposes. The latter company recently completed a large addition to its plant due to increased volume in its business.

Need Seen for More Space at Ore Docks

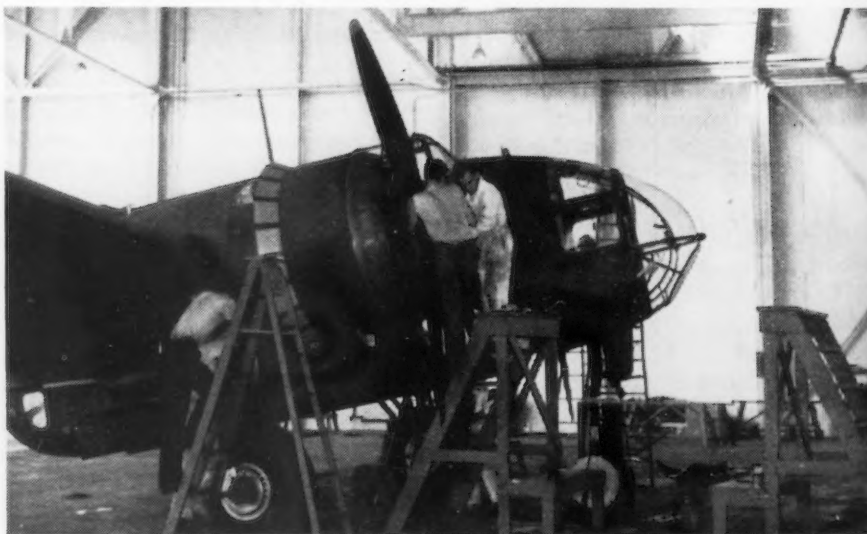
Cleveland

••• An informed observer of Lake shipping says the 25 new ore boats proposed by defense authorities might be entirely or partly unnecessary if unloading facilities at various lower lake points were improved and shipping schedules were slightly rearranged. It is estimated that additional docking facilities and storage facilities at steel plants may cost only 10 per cent as much as the \$1,900,000 per boat that might be expended for the new lake boats. Moreover, if the 25 boats are built without expanding or improving unloading facilities, it is possible that delays at the lower lakes and lack of storage facilities may prevent the enlarged fleet from carrying more ore than will probably be transported this year.

Buffalo

••• Chances are that the OPM's plan to construct a fleet of 25 ore boats for Great Lakes use may be modified, it was learned here this week. It has been discovered the program involves a far greater amount of steel than is obtainable at present without interfering with urgent marine construction at seaboard points.

FIRST HANDLEY-PAGE FOR CANADA: The first Handley-Page Hampden bomber to be produced in Canada is shown here as it was prepared for its initial test flight at St. Hubert's airport, Montreal.



Olean Firms Expand To Fill Defense Needs

Olean, N. Y.

••• Business improvement here resulting from direct and indirect national defense support has enabled this city of approximately 23,000 people to about clean up its relief rolls. An interesting sidelight is found in the inability to obtain enough workmen on a local WPA project.

Clark Bros., Inc., the city's largest metal working firm, is working at top speed with approximately 900 workmen employed. Supplying the oil and gas industry with major equipment, Clark Bros. also holds a contract for the Maritime Commission for 21 triple expansion 2500 hp. steam driven marine engines and is now in the final stages of expanding its machine shop building 20,000 sq. ft. where these engine units will be assembled.

Using the same foresight which caused its business to grow from makers of ash trays to a medium sized steel furniture manufacturing enterprise, Daystrom Corp. here has looked ahead to the possible shortage of steel used in metal furniture making and has

already laid plans to enter other fields before serious dislocation affects its payroll. The company has purchased a plywood mill in North Carolina and is also engaged in the making of a special type wall board.

As has been the case in some other cities where defense effort has drained girls from maid service into industrial work, increased opportunities, including those being afforded by a shell loading plant at Eldred, Pa., near here, where about 500 are employed, are materializing each day.

New Brass Mill To Open in 1942

Los Angeles

••• Full operation by July of next year is expected for the new seamless brass and copper tube and rod mills to be operated by the Phelps Dodge Copper Products Corp. here, according to Wylie Brown, president of the corporation.

The mill will be largely devoted to the production of cupro-nickel, aluminum brass and admiralty condenser tubes, as well as copper and other alloy tubes required by the Navy and the Maritime Commission.

Tin Mills Operating Over Rated Capacity; Doubt Curtailment

••• Heavy lend-lease requirements and a tremendous increase in domestic needs, most of which embrace the food packing industry, are causing tin plate mills throughout the country to operate several points above so-called rated capacity.

According to informed sources, it is doubtful if any substantial curtailment in tin plate production will materialize, since approximately 75 per cent of 1941 tin plate requirements are expected to be needed for food packing, THE IRON AGE has learned. While canners and can makers have not obtained an OPM priority rating, OPA some time ago specifically indicated that tin plate needs for food packing would be fulfilled.

It is estimated that no more than 600,000 tons of tin plate are available this year for general line can manufacture and even in this category, it is believed a fair proportion is going into containers which ultimately wind up as part of the national defense program. Any abrupt change-over, it is said, on tin can containers to other means, might necessitate installation of new machinery and imposition of totally new techniques for the companies making the changeover. Inasmuch as machinery for any needs except defense is hard if not impossible to obtain, no relief could be afforded in that direction. Furthermore, demands upon other means of packaging are already so heavy that it is doubtful if an additional load could be taken on.

The tin plate and container situations have been adequately studied and can companies have furnished detailed information to OPM on types of cans used, what they are used for, and the amount of steel and tin required in their manufacture.

Whether any specific reduction or quota in tin plate production may be necessary is thought by some sources to be more or less academic. The operation of the steel priority order will, in the last analysis, dictate whether and how much curtailment will take place in the tin plate market.

BACK ARMOR: Cockpit armor to protect pilots of new U. S. fighting planes, is being made by the Breeze Mfg. Corp., Elizabeth, N. J. A. L. Johnson, Jr., vice-president of the company, is shown above seated in a bomber pilot's armored housing. To the right is the back armor of a pursuit pilot's seat.

Photo by Wide World



Red Tape Hinders Financing of War Plant Expansions

••• After voluntarily making plant additions needed for defense production, many companies are having difficulty obtaining certificates of non-reimbursement covering rapid depreciation of the special facilities. Comparatively few certificates have been issued so far, THE IRON AGE has learned.

Meanwhile, latest figures prepared by the government show a total of 2420 defense industrial plant expansions and new projects with estimated cost of \$4,192,495,000. Public funds financed 523 costing \$3,293,033,000 while private financing has been used in 1904 instances covering \$899,462,000 or 22 per cent of the dollar volume (see table below).

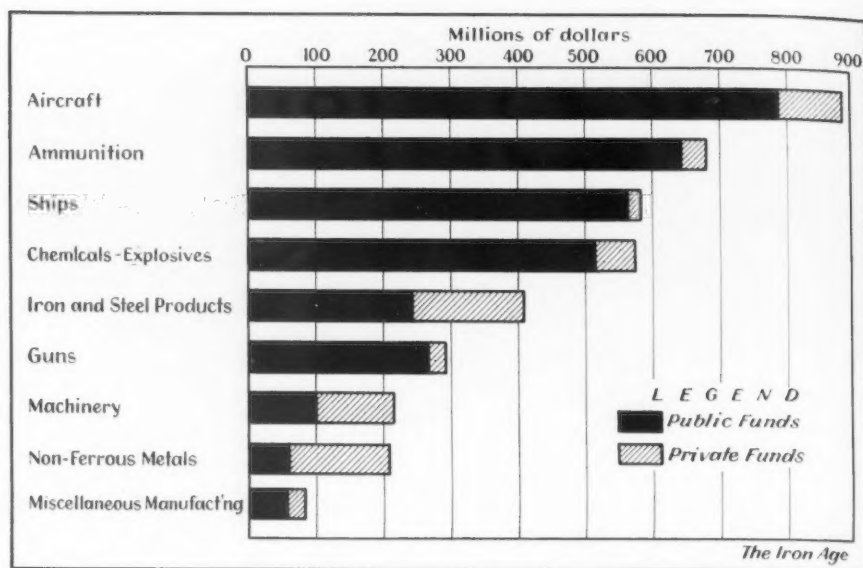
Private funds overshadow public financing in the machinery, non-ferrous metals and electrical equipment groups from the standpoint of dollars as well as number of plant expansions. The greatest numerical volume of individual expansions is in the machinery field followed by the iron and steel products division.

Where a company wishes to take amortization after arranging an expansion without government aid, certificates of non-reimbursement are necessary. Discretion lies in the National Defense Advisory Commission and either the Secretary of War or the Secretary of the Navy to certify as to the emergency nature of the facility.

The whole setup is different from that in the World War and has led to untold confusion, hesitation and chagrin. The method providing for the granting of amortization allowances makes unnecessary the computation of the usable value at the end of the emergency.

After overcoming red tape and supposedly fulfilling all requisites necessary to obtain certificates of non-reimbursement, some industrialists have run up against grounds for refusal which were totally unexpected. In one case at least, profits earned by the company proved the hidden barrier.

The latest figures covering industrial plant expansions are up to Aug. 1. Plant expansions and new projects estimated to cost



VALUE OF DEFENSE INDUSTRIAL EXPANSIONS: In leading groups up to Aug. 1, 1941. The estimated cost of 2420 expansions and new projects totals \$4,192,495,000. Of these 523 were financed with public funds and account for \$3,293,033,000 or 78 per cent of the estimated cost. Privately financed projects totaled 1904 estimated to cost \$899,462,000 covering 22 per cent of the total.

\$642,000,000 were recorded during July, with the Federal government making commitments totaling \$572,000,000 in that month.

Government funds have gone heaviest into the aircraft, shipbuilding, ammunition and chemical-explosives classifications.

The OPM report shows more funds for defense industrial facilities have gone to Pennsylvania than to any other state. The value of industrial defense expansions in that state is set at \$413,296,000, of which \$326,367,000 is public

financing and \$86,929,000 private financing. Other leading states rank as follows behind Pennsylvania:

	Total Estimated Cost	Public Funds	Private Funds
(Thousands of Dollars)			
Ohio . . .	\$364,647	\$267,142	\$97,505
New York	349,122	272,247	76,875
Michigan	285,199	248,414	36,785
Indiana . .	272,892	245,031	27,861
Illinois . .	233,282	197,460	35,822
California	188,635	147,575	41,060
Missouri	180,705	176,462	4,243

Defense Plant Expansion

(Thousands of dollars)

	TOTAL		PUBLIC ¹		PRIVATE ²	
	Number of Expansions	Estimated Cost	Number of Expansions	Estimated Cost	Number of Expansions	Estimated Cost
TOTAL	2,420	\$4,192,495	523	\$3,293,033	1,904	\$899,462
Chemicals (including explosives)	103	577,559	29	515,918	73	61,641
Products of petroleum and coal	14	31,336	2	14,334	13	17,002
Iron and steel products	349	409,815	44	241,273	306	168,542
Ammunition, shells, bombs, etc.	238	680,729	85	641,444	153	39,285
Guns	153	291,002	68	267,507	87	23,495
Aircraft	280	885,882	131	788,095	151	97,787
Ships and ship repair	126	582,737	64	562,353	62	20,384
Vehicles and tanks	64	49,996	12	30,167	52	19,829
Non-ferrous metals and their products	102	210,277	19	59,208	83	151,069
Machinery (except electrical)	508	216,672	62	100,233	446	116,439
Electrical equipment	122	35,252	19	16,965	104	18,287
Miscellaneous manufacturing	178	83,783	19	55,136	160	28,647
Non-manufacturing	215	137,455	1	400	214	137,055

¹ Includes facilities estimated to cost more than \$25,000 which are direct obligations of the War and Navy Departments. (Including financing through government Supply and Emergency Plant Facility Contracts), Maritime Commission, Defense, Plant Corp., British Government and loans of the Reconstruction Finance Corp.

² As reflected by certificates of necessity approved. Excludes pilot and mechanic training.



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CORROSION AND HEAT-RESISTING STEELS
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Odlum Tackles Job Of Spreading Out Defense Contracts

Washington

••• The new OPM division of contract distribution, established by the White House last week at a time when the defense program threatened political repercussions from material shortages, idle labor and idle plant facilities, is designed to accelerate defense production and commit the Army, Navy and prime defense contractors to more sub-contracting.

The development brings into the picture Floyd B. Odlum, of New York, who heads the \$100,000,000 Atlas Corp., largest investment company in the United States. Mr. Odlum has been a part-time adviser to OPA Administrator Leon Henderson although he has had no previous connection with the OPM defense contract service, which is replaced by the new division of contract distribution.

President Roosevelt created the new division after conferring with key officials from the Army, Navy, OPM and Maritime Commission, and after a conference with Bernard M. Baruch, chairman of the War Industries Board. Mr. Baruch, breaking a long period of silence on the defense program, emerged from the White House office, called the new super planning board—SPAB—"a faltering step forward," and recalled that the "Baruch plan" for mobilizing industry was designed so that the "little fellow" could be kept going by getting what he needed.

Mr. Baruch promised that when he appears before the House Banking and Currency Committee in two weeks hence he will "knock the everlasting life out of the Administration's pending price control bill. He also reiterated his demand for a defense reorganization to vest complete authority in a single administrator. The next day after his White House call, however, Mr. Baruch said that Donald M. Nelson, executive secretary of SPAB, may "furnish himself the solution of the need for one-man control of defense under the President."

"If he is permitted to proceed with full backing, and moves in the right direction," Mr. Baruch

said after a visit to Mr. Nelson's office, "he might furnish in himself the solution of the need for one-man control of defense under the President. Above all, he must be supported in priorities if he and the work of the SPAB are to succeed. He intends, I am informed, to enlist some very good men to assist him."

The new OPM division of contract distribution takes its place on an equal footing with other OPM divisions of production priorities purchasing, materials, and civilian supply. The executive order establishing the new division gives Mr. Odlum a mandate to make the old defense contract service, whose records, personnel and experience he inherits, a more effective aid to small business.

Mr. Odlum takes over his job with a large-scale expansion of sub-contracting procedure brewing in the OPM. The sub-contracting program, designed to head off "depressions in the midst of prosperity," was described in THE IRON AGE for Aug. 28, page 64. The program embodies Army and Navy procurement reforms which allow negotiated contracts with a 15 per cent price advantage for placing defense orders in plants faced with shutdowns due to material shortages.

In his first statement after being named director of the new OPM division, Mr. Odlum said that his work will "stimulate conversion of certain facilities to defense purposes that might otherwise become idle due to shortage of certain raw materials for less essential civilian use."

"Higher cost producers," he added, "have their place in the present all-out effort, just as the large factory uses its less efficient machines or a public utility system pulls on its old or standby equipment to tide over peak loads. The increased unit cost for a period is small compared with the alternate cost, delays, and net results."

"There are sure to be dislocations in some industries catering to less essential civilian uses because of shortages of raw materials, and their allocations and priorities. Such disruption for both employees and investors should be minimized by speedy conversion of such plants to defense production."



Photo by Harris & Ewing

SPREADS DEFENSE CONTRACTS: Floyd B. Odlum, of New York City, heads the new OPM Division of Contract Distribution, created last week, which will seek to spread defense contracts more widely, particularly among smaller companies.

Assisting the new Director of Contract Distribution will be two advisory committees, one representing small business organizations; the other consisting of industrial management, and production engineers. A White House statement said that these engineers will "formulate and execute specific plans for the conversion of non-defense industries and plants to defense production."

In addition, these three major steps were specifically mentioned by the statement in illustrating how the program will be carried out:

1. The breaking down of large orders of supplies into smaller units, and spreading the purchases

among more firms and in all localities possible.

2. Providing assistance through the labor division of OPM in retraining and obtaining re-employment for workers who are unemployed as a result of the shutting down of some plants or reduction of their output.

3. The effective distribution of defense contracts to the smaller business enterprises, as yet largely unused, through an expanded use of sub-contracting, contract distribution, and the pooling of plant facilities.

The new division also plans to expand its field staff to help business men seeking sub-contracting work. Assigned to field offices will be representatives of the government's various procurement agencies. Exhibits or "market places" will be set up in these offices in an effort to show prospective defense contractors at first hand the components needed for machine gun, aircraft or tank production.

Samples will be labeled, officials said, and instructions will be included on quantities needed, machine tools and operations require for their production. In this way defense officials hope that manufacturers, large and small, will be able to determine whether their manufacturing facilities are adaptable to the production of such items. On the basis of the examination, plus the utilization of engineering judgment of government assistants, sub-contracting arrangements can then be made.

Even as Mr. Odlum took over his new job, a government survey indicated that, despite the elaborate plans for spreading defense work, embodied in the Army's industrial mobilization program, only about half of the plants surveyed and listed by the Army are working on defense orders. Briefly, the report showed that after 14 months of defense effort, only 6657 out of 11,819 originally listed had been given defense contracts.

The survey, officials explained, did not include all companies engaged in defense work but only those plants which originally had been designated for a part in the industrial mobilization program.

Reasons for the failure of these companies to accept defense contracts were attributed to a scarcity of machine tools; civilian busi-

ness had been increasingly desirable; the impression that defense orders would bring labor trouble; the feeling that defense contracting had not yet assumed large proportions; underbidding by competing companies; and the fact that items which they were qualified to manufacture required raw materials for which they could not obtain priority ratings.

5400 U. S. Companies See Selves Hit by Material Shortages

Washington

... The plight of non-defense plants is strikingly revealed by the Chamber of Commerce of the United States which shows that nine out of 10 of the 6000 manufacturers included in a nationwide survey expressed the belief that, unless unforeseen circumstances change the situation, they soon will be forced to reduce operations drastically because of shortages of raw materials or equipment.

The outstanding shortages are in metals, the survey showed. Lack of supplies of ordinary steel, alloy steel, castings, machinery was reported in case after case,

and fear is clearly reflected over the future of the average small manufacturer. Though the new Division of Contract Distribution in OPM, headed by Floyd B. Odlum, is looked to as a source to spread defense contracts more widely among the smaller manufacturers, the reports to the Chamber of Commerce disclose that many of them are doubtful about their ability to convert their facilities to defense output. Their particular machinery, they point out, is designed only for the production of their specialized product.

While aware of the problems of government under the stress of the growing national emergency, the Chamber said, manufacturers generally expressed themselves as believing that they should have received more advance warning concerning the extent and nature of raw material shortages.

Already plants have been closed down, and forces reduced, and others are faced with shutdowns or of greatly curtailed operations. Difficulty in getting priorities even for defense work, government red tape, the failure of substitutes to solve problems, or the difficulty of getting substitutes which often are as hard to get as the regular supplies, all are reflected in reports the manufacturers made to the Chamber.

"My company is finding it in-

"V" FOR VICTORY: Employees of the Chattanooga Stamping & Enameling Co., of Chattanooga, Tenn., line up a "V" behind the new defense plant insignia recently authorized for display by OPM.



creasingly difficult to get raw materials," said a typical letter. "The future is uncertain. If things keep going the way they are, I don't see where or how we can get supplies a few weeks from now."

A Chicago manufacturer of screw machine products reported that his plant at present is running with reasonable satisfaction "considering the times" but he expects ever-increasing difficulties.

"In case of raw materials required for non-defense items," he said, "it seems to us that the near future will bring about almost complete cessation of deliveries." Defense work at the plant is only 60 per cent of its total business, the Chamber said.

A Virginia manufacturer of signs reported that sheet steel is essential to his business, that he has tried a number of substitutes without success, and normally employs over 200 people.

"A month ago I had to release 60 of them," he reported to the Chamber.

A Pennsylvania manufacturer of radio tubes illustrates the doubt of some producers that they cannot fully convert their specialized machinery to defense production. He reported:

"Our problem, basically, is that our equipment for the manufacture of any of our products—radio receiving tubes, incandescent lamp bulbs and fluorescent lamps—is very highly specialized. We are not equipped mechanically to manufacture diversified items required for the defense program. We probably have received our proportionate share of defense business in orders for those items we are equipped to produce. But defense business will not come close to making up for our loss of normal business."

Production experts who think they have the answer in substitutes are simply disillusioned, the Chamber said, when they found that the new material is also on OPM's priorities critical list.

From New York comes a report from a manufacturer of bracelets for wrist watches. He has successfully developed several substitute materials, but stainless steel wire is essential to the manufacture of his product. In order to continue operations, he must have 20 lb. of this wire. Its value is about \$40. The manufacturer says:



Photo by AP
LOADING A SPITFIRE: A mechanic reloads the magazine of what British sources describe as a new cannon mounted in the wing of a Spitfire. These guns fire an explosive shell.

"In view of the fact that we have no priority number, we are not in position to obtain any more of this material. Unless we can solve this problem immediately, it will be necessary to lay off some of the 350 employees whom we now have on the payroll. The stainless steel wire cannot be replaced by any other metal because as soon as the springs corrode, the article becomes useless."

A small but marked proportion of manufacturers report that many materials of vital importance are becoming increasingly difficult to obtain, despite the fact that their plants are directly or indirectly engaged, for the most part, on defense work. In this connection, for example, an Ohio manufacturer asserts:

"It is rapidly getting to the point where a small manufacturer, such as ourselves, will be forced to cease operations. This in spite of the fact that a minimum of 70 per cent of our sales are for defense projects.

"We have applied to the Priorities Division for assistance, but we are still without any direct help. We have had two representatives in Washington discussing the matter with the division, and each time they give us an entirely different story as to what is necessary and what we are to do."

One of the major problems of many small manufacturers is to be found in the difficulty of obtaining priority ratings when their work is not of a direct defense character, although essential to defense, since they act as suppliers for defense prime or sub-contractors.

Ordnance Projects Get High Ratings On Rails

Pittsburgh

• • • Urgent requirements for new rails to be used on government ordnance projects are expected to furnish an additional hurdle which railroads will encounter in getting shipment of their rails now on mill order books.

Several ordnance plants are using new rails for trackage and plants now in the blueprint stage also call for the new product.

Scarcity of relaying rails has forced the supplying of new rails although early in the defense program some ordnance plants were able to obtain sufficient tonnage of relaying rails which took the load from steel mills.

All rail for ordnance work is taking A-1-a or A-1-b priority ratings and the tonnage for rail trackage to and in these plants is expected ultimately to be substantial.

A summary of the factors with which rail mills must contend while they are attempting to fill regular rail orders with the railroads are as follows: Rolling of billets for British consumption which carry an A-2 priority; rolling of munition steel on the rail mills; and the production of structural steel shapes which currently are in exceptional demand. All of these items carry priority ratings and rails for the nation's railroads, at the present time at least, cannot be manufactured until after defense items have been cared for. It is also said a considerable tonnage of rails with priority ratings must be furnished promptly for industrial use.

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McKay Tube Mills—built in a complete size range—all possess certain characteristic design features which have proven of definite value under actual production conditions. We list a few of the outstanding features:

SINGLE UNIT CONSTRUCTION: Forming Units—Welder—Flash Trimmer—Sizing and Straightening Units and Cutoff are mounted on a one piece welded bed plate, heavily reinforced—with the accurate alignment shoulders required—permanently machined onto the top surface. This makes the machine an entirely self-contained unit, with none of the field alignment problems which occur where separate units are used.

MCKAY FORMING ROLL DESIGN: Maintains accurate seam alignment, necessary for good seam weld. It also produces a smooth tube, with size maintained closer than commercial tolerance requirements.

CENTRALIZED CONTROLS: Heat, speed and pressure controls placed for maximum convenience of operator.

ROTARY TRANSFORMER TYPE RESISTANCE WELDER: McKay-AmerTrans. construction gives 92% to 95% power factor—efficiency at welding point 90 to 95%—accurate heat regulation—maximum accessibility of electrode rolls without disturbing transformer or bearings.

CUTOFF: High speed rotary head or rotary saw available, to suit requirements.

QUICK CHANGE-OVER: Actual production conditions prove that a complete change-over from one size tube to another can be made in less than three hours by regular operator and helper. This is because McKay construction includes enough auxiliary equipment so that units may be interchanged without disturbing vital settings.

MCKAY "McKROMETER" ROLL PRESSURE ADJUSTMENT: (Covered by U. S. Patent 2,122,615.)

Allows actual recording of correct pressure settings at each pass for each diameter and gauge tube.

FLOOR SPACE REQUIREMENTS: Single unit construction cuts floor space requirements in half. Machine illustrated will make up to 1½" tube—space required 21' 0" by 6' 0"

The above represents only a few of the advantages of McKay equipment. Call on us for complete information, samples and demonstration.



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CONVENIENT—any part can be patched without recoating the entire rack

EASILY APPLIED—dipping is done in the container in which it is shipped—the material dries at room temperature.

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100—THE IRON AGE, September 11, 1941

Priorities Rating Issued for Foundry Equipment Items

Washington

• • • A limited blanket rating order, assigning to manufacturers of foundry equipment and repair parts the high defense ratings of A-1-b and A-1-c for the acquisition of six listed items, was issued by OPM's priorities division.

The six items are castings and forgings; sheets, bars, shapes, plates and tubing (ferrous, non-ferrous and non-metallic); electrical equipment and accessories; mechanical equipment and accessories; cutting tools, including cemented carbides; and maintenance and shop supplies, restricted to items necessary for proper operation and maintenance of manufacturing equipment and facilities.

The order, issued by Director of Priorities Donald M. Nelson, assigned the A-1-b rating to deliveries of these materials to makers of molding and core machines; blast cleaning equipment; dust arresters; sand preparing and handling equipment; and briquetting equipment.

The A-1-c rating was assigned to manufacturers producing melting furnaces, blowers, ladles, tumbling mills, shakeout equipment, and mold and core ovens. These ratings, OPM explained, may be extended as far as is necessary to assure ultimate delivery of the required materials to the manufacturer. Under the terms of the order, a manufacturer receiving the assistance of these priority ratings may fill only defense orders for the products thus expedited, or such other orders as the Director of Priorities may direct him to meet.

OPM Auto Branch Chief Quits

Washington

• • • James S. Adams, chief of the OPM automotive branch when it worked out the recent automobile production curtailment quotas, has resigned to return to his job as executive vice-president of the Colgate - Palmolive - Peet Co. An OPM statement explained that, while Mr. Adams will remain on the OPM staff as a consultant subject to call, he found it necessary to resign because of the illness of his business associate, E. H. Little, president of the Colgate company.



Photo by Wide World

WHY NOT USE TANK CARS? The statement by J. J. Pelley, president of the Association of American Railroads, that the gasoline and petroleum shortage in the East could be solved in two weeks by the use of 20,000 railroad tank cars, aroused much interest in Washington last week. Pelley is shown at the hearing of the special Senate investigating committee.

OPM Places Priorities On Three More Chemicals

Washington

• • • Three more chemicals, all employed either directly or indirectly in the manufacture of Navy degaussing cables, have been added to the list of those subject to full priority control. OPM's priorities division said that the order, which is designed to conserve supplies and direct the distribution into essential products, covers tricresyl and triphenyl phosphates; phenols; and phosphorus oxychloride.



MONARCH COVERS THE TURNING

MONARCH LATHES

SIDNEY, OHIO, U. S. A.



CHICAGO SALES OFFICE: 622 WEST WASHINGTON BOULEVARD • INDIANAPOLIS SALES OFFICE: 3910 E. 57TH STREET • NEWARK SALES OFFICE: 1060 BROAD STREET • PITTSBURGH SALES OFFICE: 604 CHAMBER OF COMMERCE BLDG • Agencies in principal industrial centers of this and foreign countries.



And the "BUDGIT" HOIST is ready to work. Lifting dead weights in the production line is a costly and obsolete waste of brains and energy. Now that "BUDGIT" HOISTS LIFT QUICKLY, INEXPENSIVELY with no strain on workers it is a crime against common sense to tolerate manual lifting.

Free the hands of workers to produce, not to lift. RID THEM of the danger of RUPTURE AND STRAIN.

Best of all, speed up production by installing "BUDGIT" HOISTS wherever indicated and profit by the experience of others in hundreds of industries and many thousand installations.

Write us now for full details about "Budgit" Hoists from \$119 up, with lifting capacities of 250, 500, 1000, and 2000 lbs.



Send for catalog containing complete information, also, "Time Saving Calculator" that shows savings they earn.

'BUDGIT' HOISTS

**SHAW-BOX CRANE & HOIST DIVISION
MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN**

Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists . . . Send all your crane and hoist inquiries to Shaw-Box!

THIS WEEK'S

Prices and Priorities

Steel warehouses given priority rating of A-9 for obtaining stocks for resale. Amount of steel obtainable under such a rating to be governed by quotas to be set up quarterly. (OPM-PM1080)

Waste material industry called upon to increase its collections by 20 per cent to relieve shortages. Advisory committee of waste dealers to be formed to work with defense officials. (OPM-PM1077)

Strategic highway construction to be given priority rating where necessary to obtain required supplies. Ratings range from A-1-b to B-3 (OPM-PM1074)

Scientific research granted priority rating of A-2 to assist laboratories in obtaining needed supplies. Application must be made to Washington before rating may be used. (OPM-PM1050)

Aluminum scrap and secondary metal price ceilings may be revised downward. The problem is being studied by defense officials and interests. (OPA-PM1070)

Railroad rails sold for relaying purposes have been removed from the scrap steel price schedule and put in the iron and steel products schedule. (OPA-PM1091)

Scrapping of old automobiles on an intensified scale to be studied at meetings in Michigan, Wisconsin, Minnesota. (OPM-PM1085)

Foundry equipment items have been given limited blanket preference ratings of A-1-b and A-1-c, covering both new equipment and repairs. (OPM)

Phosphorus oxychloride, tricresyl and triphenyl phosphates and phenols, used in the manufacture of degaussing cables, have been placed under full priority control. (OPM)

Nickel scrap ceiling prices revised to a limited extent on Sept. 8; maximum prices for stainless steel turnings and borings established.

★ ★ ★

For copies of above announcements address defense agency concerned, at Washington, giving announcement number as shown in brackets after each paragraph. (OPM-PM1032 means announcement 1032 issued by Office of Production Management.)

OPM Releases Data on Heat Treating Molybdenum

Washington

• • • Three reports on heat treating molybdenum high speed steels were released by the OPM this week, entitled:

"Heat Treatment of Molybdenum High Speed Steels"
"Salt Bath Method for Hardening Molybdenum High Speed Steels"
"Controlled Atmosphere Furnaces for the Heat Treatment of Molybdenum High Speed Steels."

These reports are the result of several months intensive work by special committees under the direction of Bradley Stoughton, Chief of OPM's Heat Treating Equipment Unit of the Tools Section.

Recommendations by the committees on best practice in heat treating these high speed steels are contained in the reports, as well as correct procedures and sources of engineering and metallurgical assistance.

S-T Plans Sintering Plant and Blast Furnace Enlargement

Youngstown

• • • To reduce ore smelting time and increase blast furnace output, Youngstown Sheet & Tube Co. will construct a sintering plant with a 60,000-ton monthly capacity to be ready for operation next spring. The company plans to rebuild and enlarge its D blast furnace, increasing its capacity from 700 to over 1000 tons daily and will also relined its Jeanette blast furnace at Brier Hill. D furnace has produced about 2,000,000 tons of iron on its present lining. Changes at the billet mill increasing rolling capacity 200,000 tons annually at the Campbell plant are nearly completed.

The contract for remodeling and enlarging the blast furnace has been awarded to the William B. Pollock Co.

STOP SHIPPING LOSSES BY ANCHORING PRODUCTS

for SAFE DELIVERY



TODAY the keynote in industry is: **Speed up production. Speed up delivery.** Here is a simple, practical suggestion that your packing department should adopt to speed up safe delivery. Instruct your packers to make it a practice to use EVERLOCK WASHERS on all bolts and screws used on crates.

With increased traffic, whether by truck or train, severe impacts and jolts are likely to occur. If your products are crated and if they are highly polished, be it wood or metal,

porcelain, enamel, paint or plating, they will reach their destination without a scratch or chip if EVERLOCK WASHERS are used to anchor them to the crates. Jolts and shocks in transit drive the EVERLOCK WASHER teeth deeper and tighter into the adjoining surfaces.

Many nationally known stove manufacturers and the manufacturers of other types of commodities are using this application daily.

Whether your commodities are household appliances, factory or

office equipment, machinery or furniture, heavy or light, fragile or durable, fasten them rigidly in their crates by using EVERLOCK WASHERS on your bolts and screws.

The construction of each EVERLOCK tongue holds the secret of the digging-in action of the EVERLOCK WASHER tooth. Vibration only serves to drive the teeth deeper.

There is an EVERLOCK WASHER of the right size and type for every purpose. Start using them now.

THOMPSON-BREMER CO. 1640 W. HUBBARD ST.
CHICAGO, ILLINOIS

Everlock Washers

OFTEN OTHER WASHERS HAVE BEEN TRIED, NOW EVERLOCKS ARE SPECIFIED

PRINTED IN U.S.A.



The Marine Industry

... has long been a user of Heppenstall products—propeller shafts to propel ships, shear knives for cutting metals, Heppenstall Automatic Safe-T-Tongs for lifting cargo, die blocks for forged parts and products, "tailor-made" forgings for special applications, and many other forged products. Heppenstall Company.

Heppenstall



PITTSBURGH · DETROIT · BRIDGEPORT

Trundle Proposes U. S. Inventory Week

... George T. Trundle, president, Trundle Engineering Co., Cleveland, proposes a National Inventory Week as a means of clarifying present national difficulties over supplies available and actual requirements. Mr. Trundle's proposal is that manufacturers would inventory and report their materials and supplies on hand and work in process. Dealers in various materials, such as scrap and cotton, retailers, and selected housewives would also report goods on hand so that estimates could be made as to the actual inventories of the nation as a whole. It is believed that this would permit a more intelligent establishment of priorities and effective control of vital materials.

Contracts Boost Backlogs of Ohio River Shipyards

East Liverpool, Ohio

... Boat yards here have had their heavy backlog increased with the recent Army award for four additional mine planters and contracts for a fleet of 60 barges for the coal and coke trade, and two more barges for the Panama Canal Department. This brings the number of mine planters on order from the Marietta Mfg. Co. at Point Pleasant, W. Va., to 16, all steel vessels rated at 12,820 tons. The Panama barge order total has been boosted to five Hopper type vessels for sand and gravel haulage to be used in Canal dredging. Carnegie-Illinois Steel Corp. placed the order for the coal and coke barges with the Ambridge yards of American Bridge Co. The work will require 8400 tons of steel plates and shapes.

Ohio Strike Delays Bonneville Power Delivery

... A strike which has tied up production in the Ohio Brass Co. plant at Barberton, Ohio, since last May 28 has resulted in a minimum delay of eight weeks in energization of the Bonneville Power Administration's high voltage transmission lines between Walla Walla and Colfax, Wash., S. E. Schultz, Bonneville's chief engineer, has reported to Administrator Paul J. Raver.

Plants Prepare for Gas Shortage in Pittsburgh

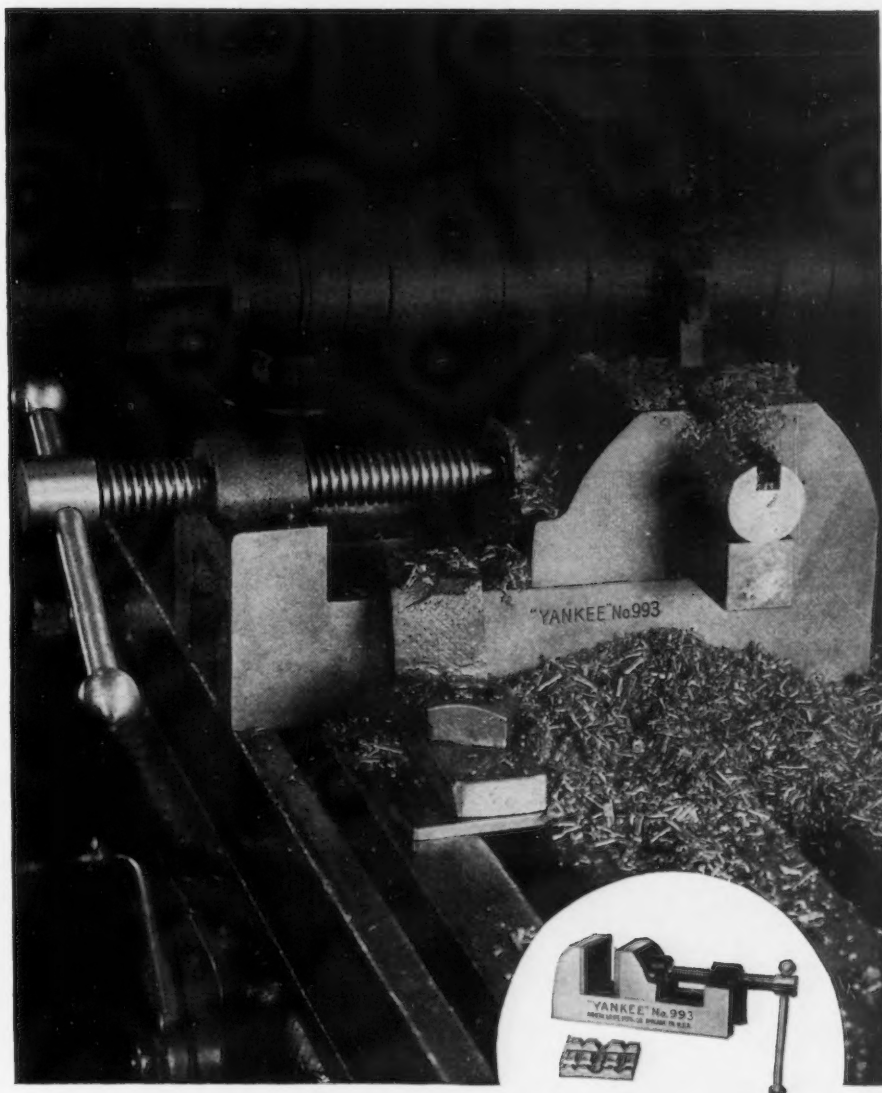
Pittsburgh

••• Leading gas companies here and in nearby territories have warned industrial firms to make provisions for possible temporary gas shortages this fall and winter, owing to the heavy drain on supplies by the national defense program. Domestic consumers and concerns with defense business will be supplied first but in the case of the latter it is said there will probably be times when substitutes will be needed. Assuming normal winter weather, shortages are not expected to be severe.

Some large steel companies, which use a mixture of natural gas and coke oven gas as fuel, are now securing and storing supplies of liquid fuels in case a changeover becomes necessary on sudden notice. Most mill equipment is such that liquid fuels can either be used directly or mixed with gases. Some plants in the district actually use 100 per cent natural gas in primary operations and measures are now being taken to prevent shutdowns. Last winter some time in production was lost because of a temporary gas shortage.

Industrial Milestones

••• The Chain Belt Co., Milwaukee, on Sept. 9 celebrated the 50th anniversary of its founding. The company was capitalized in 1891 at \$8,500, but began operations on \$255. Its sole product was malleable iron chains for farm machinery, which at that time were replacing leather belts. In 1900 the company added elevators and conveyors to its product, in 1908 concrete mixers, in 1912 road pavers, followed by centrifugal water pumps and other construction equipment. In 1930 the company started manufacture of sewage disposal and water treatment equipment, and in 1939 the Baldwin-Duckworth Chain Corp., one unit of which was founded in 1871, was merged with Chain Belt. J. C. Merwin, who joined the company as superintendent in 1917, is president.



"YANKEE" VISE SPEEDS PRODUCTION

"Yankee" is a *fast-production* vise—different from any other vise in your shop! Squared all sides. Designed for continuous work—from bench to machine and back again—accurate results and no delay. "Yankee" Vise illustrated above, made in four sizes: No. 991, 1½" jaw width. No. 992, 2" jaw width. No. 993, 2¾" jaw width. No. 994, 4" jaw width. Hardened steel block, V-grooved, supplied for holding rounds.

"Yankee" Vise also available with removable swivel base. Sizes, Nos. 1991, 1992, 1993 and 1994.

ORDER FROM YOUR SUPPLY HOUSE. FOR "YANKEE" VISE CIRCULAR, WRITE NORTH BROS. MFG. CO., DEPT. M, PHILADELPHIA, U. S. A.

NORTH BROS. MFG. CO., PHILADELPHIA, U.S.A.

September Pig Iron Output Allocated

• • • Tuesday of this week pig iron producers received their long awaited September pig iron shipment schedules which had been scrutinized and revised by OPM in accordance with the pig iron priority order. The entire September

production has been allocated and practically all the material is slated for shipment to consumers carrying a defense rating. In a small number of cases essential civilian requirements have been partially taken care of.

As expected, the entire pool of 2 per cent, the amount which each producer is to lay aside during September, has also been allo-

cated, and the majority has gone to non-integrated steel companies short of pig iron and to foundries with heavy defense business.

Initial information indicates that considerable revision was made on some of these schedules, the OPM eliminating some shipments and adding others. In most cases pig iron producers had only enough iron scheduled for September to take care of urgent requirements, hence the realignment made by OPM is believed to have involved the urgency of the requirements as well as the size of inventories reported to the OPM by all pig iron consumers. It is believed that some of the orders were eliminated from September shipping schedules, after scrutiny of these customers' inventory data by the OPM.

Already some controversy has appeared within the industry over the fact that some pig iron producers have been instructed to deliver pig iron to points distant from the point of production, necessitating substantial freight absorption. It is recalled that the pig iron price fixing order requires that the delivered price be equal to the base price plus the transportation from the nearest basing point, whereas the steel pricing order allows the steel mill in question to charge an f.o.b. basing point price plus transportation from the point of production even though the latter may not be the nearest basing point for that product.

This situation is expected to cause agitation for a revision in the pig iron pricing order so that it will correspond to provisions in the steel price order. It is pointed out also that some steel companies which urgently needed their pig iron production for steel ingot output had to set aside 2 per cent of their September production and a number of steel companies and blast furnaces which were producing special iron for Great Britain also had to withhold 2 per cent of their total production for the pool. It is argued in some quarters that situations such as these should be granted a credit in any pool arrangements. Likewise some sources maintain that some furnaces instructed to supply material to other points have a greater amount of defense business on hand than

INSPECTION *may be a waste of time*

Inspection that impedes the finishing of forgings may be a waste of time. Forgings are either sound or unsound and forgings having sound physical structures are usually free of concealed defects, and should require no delaying inspection. T & W inspection of forgings checks on more things than the specifications call for. It provides you with a coverage that makes practical a reduction in your checking detail, which in turn, avoids delay and cuts the expense of checking to a minimum.

Ask a T & W forging engineer about T & W inspection procedure that makes for faster finishing of forgings.



FORGINGS

**USUALLY COST LESS
AT THE POINT OF
ASSEMBLY**

TRANSUE & WILLIAMS
STEEL FORGING CORPORATION
ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland

has the company to which the pig iron is going.



Cleveland

••• From the bookkeeping standpoint pig iron producers' troubles have been sharply increased by the priority order since they have been lately ordered to fill out a new form, beginning October, setting forth their orders for that month in alphabetical arrangement and including a new column showing a simple mathematical computation of the difference between the tonnage requested and the tonnage scheduled. The new column will be designated "not scheduled." Since most of this information was submitted to the OPM with the September order list, this requirement means, in effect, a duplication of bookkeeping work.

Cleveland to Hold Meetings To Speed Sub-Contracting

Cleveland

••• The national movement to speed up sub-contracting was marked here by an announcement by the Defense Contract Service that conferences will be held in seven Ohio cities and in Erie, Pa., to bring the prime contractor to the door of the small prospective sub-contractors. Called a "defense caravan," the plan is similar to the defense clinics being carried on in New York State. Prime contractors who will be represented at the meetings include General Electric Co., Westinghouse Electric & Mfg., Lima Locomotive Works, Bendix Aviation Corp., Curtiss-Wright Corp., Wright Aeronautical Corp., Thompson Products, United Engineering & Foundry, Chase Brass & Copper, Electric Auto-Lite, Fisher Body, and Pullman-Standard Car Mfg.

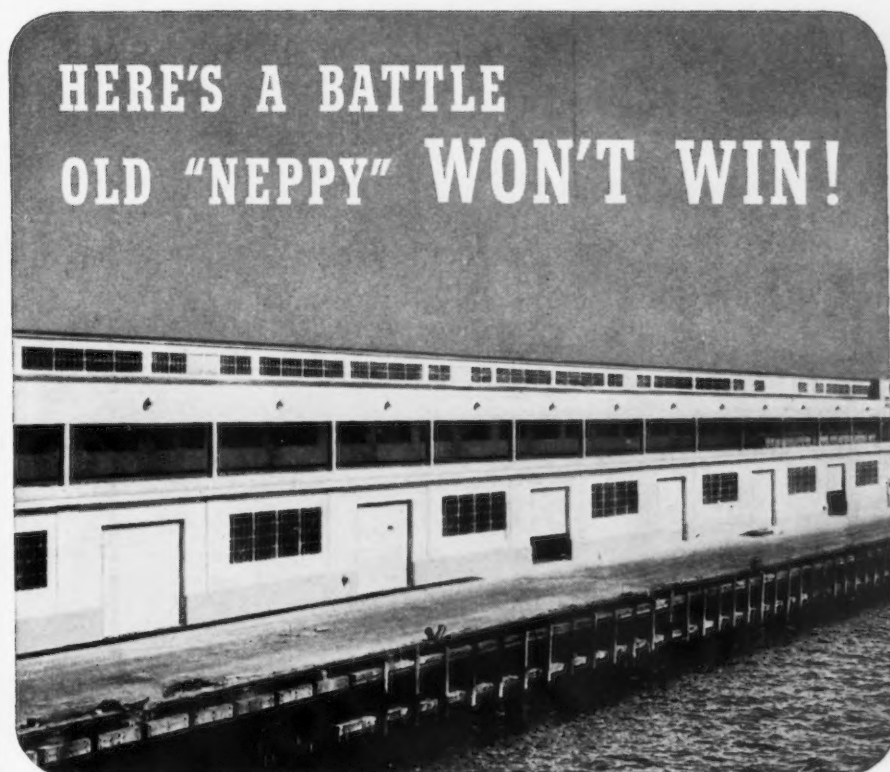
A-9 Rating for Warehouses Seen Too Low for Relief

Pittsburgh

••• An analysis of the OPM's supplementary order, M-21-B, giving a preference rating of A-9 to warehouse interests, indicates, according to some sources, that the same difficulty which has heretofore

been encountered in obtaining plates, shapes, and to some extent bars, will continue under the new order. It is pointed out that steel mills are up to their necks on A-1-A and A-1-B plate priorities and hence there is little chance, for months at least, of orders carrying an A-9 for plates being fulfilled. The same situation applies with respect to structural shapes, it is said, although ware-

house interests may find some relief in obtaining certain types of bars, sheets, wire, and tubular goods. Attention is called to the definition of a warehouse which reads, "Any person who receives physical delivery of steel from a producer for sale or resale in the form received." This is being interpreted here as covering jobbers and dealers as well as specific warehouses.



Old Neptune's salty breath is a death sentence for most sheet metals. Few can long survive its corrosive action, even when other service conditions are favorable.

One metal that can "take it" is ARMCO Ingot Iron Galvanized PAINTGRIP. That is why 56 tons of durable PAINTGRIP were used for cornice, coping, monitors, louvers and siding on this pier building at Long Beach, California.

The durability of galvanized ARMCO Ingot Iron is proved in veteran seacoast installations. Now extra protection is assured by the special

paint-gripping surface of ARMCO Galvanized PAINTGRIP sheets. The bonderized zinc coating readily takes paint and field tests show that it lasts three times longer than paint on ordinary galvanized metal.

Whether your new "defense" buildings need protection from salt air or corrosive industrial atmosphere, experience indicates they will last years longer at little extra cost when you use ARMCO Ingot Iron Galvanized PAINTGRIP. Your inquiry will receive prompt attention. Just address The American Rolling Mill Company, 2611 Curtis Street, Middletown, Ohio.

ARMCO  **PAINTGRIP**

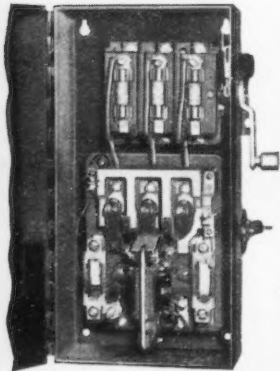
Joe...the employees in your new plant will be safer with G-E combination starters

"We've found that we can place these starters next to a machine without fear of operator's tampering with box while machine is in operation."*

*Statement by Raymond Dingler, chief electrician,
Monolith Portland Midwest Co., Laramie, Wyoming

Safer than Separate Devices

in 3 Ways—



SAFER because the fused manual circuit switch is *selected* for use with your motor—no danger from interrupting heavy overcurrents in an emergency.

SAFER because the cover *can't* be opened as long as the circuit switch is closed and power is applied to the starter and the machine.

SAFER because *as long as the cover remains open* the line switch cannot be accidentally closed, applying power to the parts being inspected.



GENERAL  ELECTRIC
676-44-8490

NEWS OF

Work Pool Provided In Contract Signed With Weirton Union

Weirton, W. Va.

• • • The Weirton Steel Co. early this week signed a contract with the new Weirton Independent Union, formed about two months ago. A preliminary contract had been granted the independent union upon certification that it had a "substantial majority" of employees.

According to union officials the contract provides for a minimum pay guarantee of 72½¢ an hr. or \$5.80 for an eight hour day and this guarantee applies to all employees, male and female, whether they work on tonnage, piece work, or by the hour. A "work reserve" or pool of employees who are laid off because of slack work or changes in manufacturing methods is provided for and the company is obliged to draw upon this pool before hiring new men. An employee who has a death in his family is entitled to three days' time off without loss of wages. As "inflation insurance," the agreement provides for cancellation of contract on 30 days' notice. The union agrees not to strike during the life of the contract.

Scheduling Difficulties Harass Bar Makers

Pittsburgh

• • • While the spotlight plays on the tight plate and structural situation, steel bar makers throughout the country are already getting their taste of similar complexities in scheduling operations.

Some bar mills have been forced to shut down for temporary periods or curtail operations owing to the heavy drain on semi-finished supplies for British requirements which carry an A-2 rating. Coincident with this has been the tremendous growth in concrete bar orders, the greater percentage of which today are carrying an A-1-a and A-1-b rating.

Another factor causing grey hairs in the bar industry is the necessary scheduling of material for cold drawing purposes, much of which carries a high priority rating and is used for ammunition purposes.

Subletting Clinic Set For New York

• • • As part of the nationwide effort to increase subcontracting, the Defense Contract Service will hold a national defense production clinic in the Grand Central Palace, New York, on Sept. 22, 23 and 24, in conjunction with National Defense Exposition which will run from Sept. 20 to Oct. 18. The clinic, which is designed to show subcontractors the nature of the work available for subletting, will be attended by many holders of prime contractors, according to the contract service, who will be available for consultation.

Go After Defense Orders, West Coast Plants Told

San Francisco

• • • Do not wait for the Army or Navy to seek you out for defense orders, West Coast manufacturers were told last week by W. C. Stauble, chairman of the Industrial Supplies Defense Committee. "Go after defense orders yourself, now, so that you may lessen on your own business the impact of whatever priority dislocation that may occur," he advised.

Missouri Pacific Buys 2850 Freight Cars

St. Louis

• • • Missouri Pacific railroad has placed orders for 2850 freight cars, allocated as follows: American Car & Foundry Co., Madison, Ill., 1450 50-ton box cars, and 50 50-ton covered cement cars; Mount Vernon Car Manufacturing Co., 50 70-ton drop end coal cars; Pullman Car & Manufacturing Co., 500 70-ton coal cars; Pressed Steel Car Co., 650 50-ton gondola cars, and Bethlehem Car Co., 150 50-ton flat cars.

Sun Orders Tanker Steel

Philadelphia

• • • Sun Shipbuilding Corp. has placed orders for steel to build 15 new oil tankers, United States hull Nos. 306 to 315 and 394 to 398. Allocations for this steel were made on the same basis as those made early this summer when construction of 72 tankers was started.

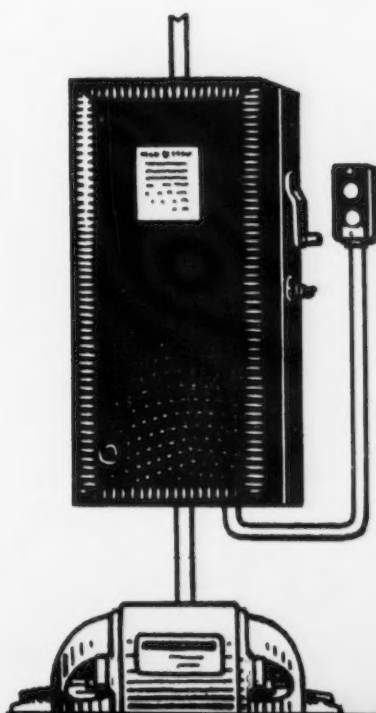


**You bet...we're planning
on them. You know they take
less time to install, too**

"Our experience shows that it takes less labor to install G-E combination starters than to put in separate devices. And they save on conduit."*

*Statement by Walter B. Atchinson, electrical engineer of a large valve plant

**Here's all an electrician
needs to do to install a
G-E combination starter**



- A.** Mount one compact starter (not two devices).
- B.** Run conduit and pull wires to motor, push-button, and power supply.
- C.** Make 9 quick connections (not 15) in starter, insert fuses, and—motor is ready to run.

Send for "More for Your Control Dollar" (GES-2456). General Electric, Sec. 676-44, Schenectady, N. Y.

GENERAL  ELECTRIC

Operations Resumed at Mill Long Idle in Canada

Toronto

••• East Calgary Rolling Mills, formerly Manitoba Rolling Mills, Calgary, Alta., subsidiary of Dominion Bridge Co., Ltd., Montreal, Que., after being shut down since 1930, has resumed operations in the 10-in. rolling mill and is putting the 20-in. mill in shape for produc-

tion. At present 125 men are employed at the works. The plant was installed in 1928 at cost of \$1,000,000 but only operated about two years. Earlier in the year, announcement was made by the Federal Government that the plant would be moved to Vancouver, B. C. It is stated that the Calgary plant will provide steel for the big shipbuilding activities in British Columbia.

Defense Production Suffers In Pressed Steel Car Dispute

Pittsburgh

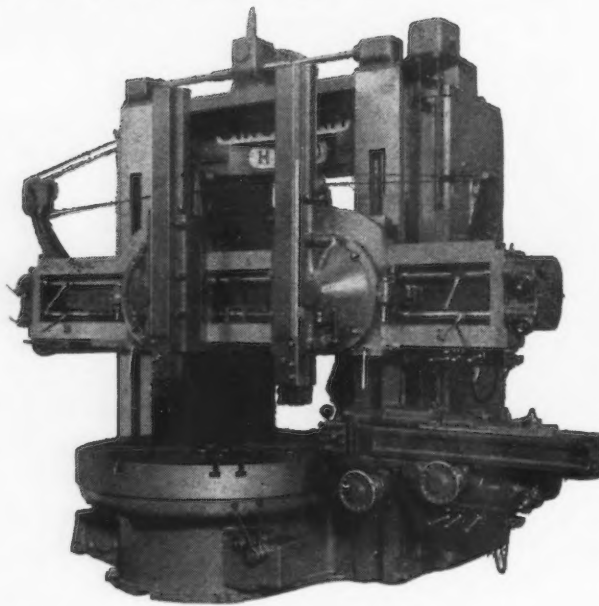
••• Employees of the Pressed Steel Car Co., many of whom were prevented from working during the past 10 days by a CIO picket line, returned to work early this week at the request of the National Defense Mediation Board.

Approximately 180 freight cars, an item urgently needed in national defense, were lost permanently by the enforced shutdown. A six to seven day hold up in the production of shell forgings and armor plate was also a result of the strike.

Cincinnati

SPIRAL BEVEL GEARED

HYPRO VERTICAL BORING MILLS



Engineered to combine speed, flexibility and ease of control with power, rigidity and accuracy to meet the requirements of today.

Designed for:

1. Centralized Pendant Station Control which provides operation of the entire machine from the operator's position.
2. Individual feed and rapid traverse boxes with independent Rapid Traverse Motors for each head, making it possible to control each head independent of the other.
3. Automatic lubrication provided to all feed boxes, table drive, heads and saddles requiring no attention on the part of the operator.

In these competitive times, you need this kind of equipment. Full particulars sent upon written request.

Sizes—54", 64", 72", 84", 100", 120", 144".

PLANERS • PLANER MILLERS • BORING MILLS
THE CINCINNATI PLANER CO.
 CINCINNATI, OHIO

Coming Events

- Sept. 17 to 19—National Industrial Advertisers Conference, Toronto.
- Sept. 18 to 20—Concrete Reinforcing Steel Institute, annual meeting, Colorado Springs.
- Sept. 23 to 26—Association of Iron and Steel Engineers, annual exhibition and meeting, Cleveland.
- Sept. 25 and 26—Society of Automotive Engineers, National Tractor Meeting, Milwaukee, Wis.
- Sept. 25 and 26—Powdered Metallurgy Conference, annual meeting, Cambridge, Mass.
- Sept. 29 to Oct. 2—American Mining Congress-Metal Show, San Francisco.
- Oct. 1 to 4—Electrochemical Society, Fall Meeting, Chicago.
- Oct. 2 and 3—American Hot Dip Galvanizers Ass'n., Inc., Semi-annual Meeting, Netherland Plaza Hotel, Cincinnati.
- Oct. 6 to 10—National Safety Congress and Exposition, Chicago.
- Oct. 8 to 10—Porcelain Enamel Institute, annual forum, Chicago.
- Oct. 14 to 16—American Railway Bridge and Building Ass'n, Chicago.
- Oct. 14 to 17—American Institute of Steel Construction, annual convention, New York.
- Oct. 16 to 18—American Society of Tool Engineers, semi-annual meeting, Toronto.
- Oct. 19 to 24—American Welding Society, annual meeting, Philadelphia.
- Oct. 20 to 22—American Gear Manufacturers' Ass'n, Semi-annual Convention, Edgewater Beach Hotel, Chicago.
- Oct. 20 to 22—American Gas Association, Atlantic City, N. J.
- Oct. 20 to 24—National Metal Congress, Philadelphia.
- Oct. 23 and 24—Society of Automotive Engineers, Tulsa, Okla.

Some Steel Buyers Slow To Learn About Rationing

Chicago

••• Steel executives here have told THE IRON AGE that despite the flood of priority orders and restrictions and the publicity given them, a surprising number of civilian and even defense steel buyers are unconscious of the stringency of these regulations. They apparently believe that their "friends at court" in steel sales offices can take care of their needs and are not only surprised but indignant when it is patiently explained to them that steel producers no longer can take care of a company simply because it is a good friend.

One company president heatedly asked the assistant sales manager of an important mill, "You don't mean to tell me that you are paying any attention to these priorities, I'm not; I thought you'd take care of all my steel needs." When it was explained that steel mills, like it or not, are following government orders implicitly, the customer refused to be placated and vowed he would tell his congressman.

Pollock Plant to Ship Two Blast Furnaces to Brazil

Youngstown

••• Expansion of iron and steel producing capacity in line with the defense program is keeping the William B. Pollock Co. plant here occupied in tearing out seven blast furnaces, scores of ladle cars and other steel plant and blast furnace equipment. Two new blast furnaces of 100 tons capacity each will be shipped to Brazil.

Canada Tightens Control Over Warehouse Supplies

Toronto

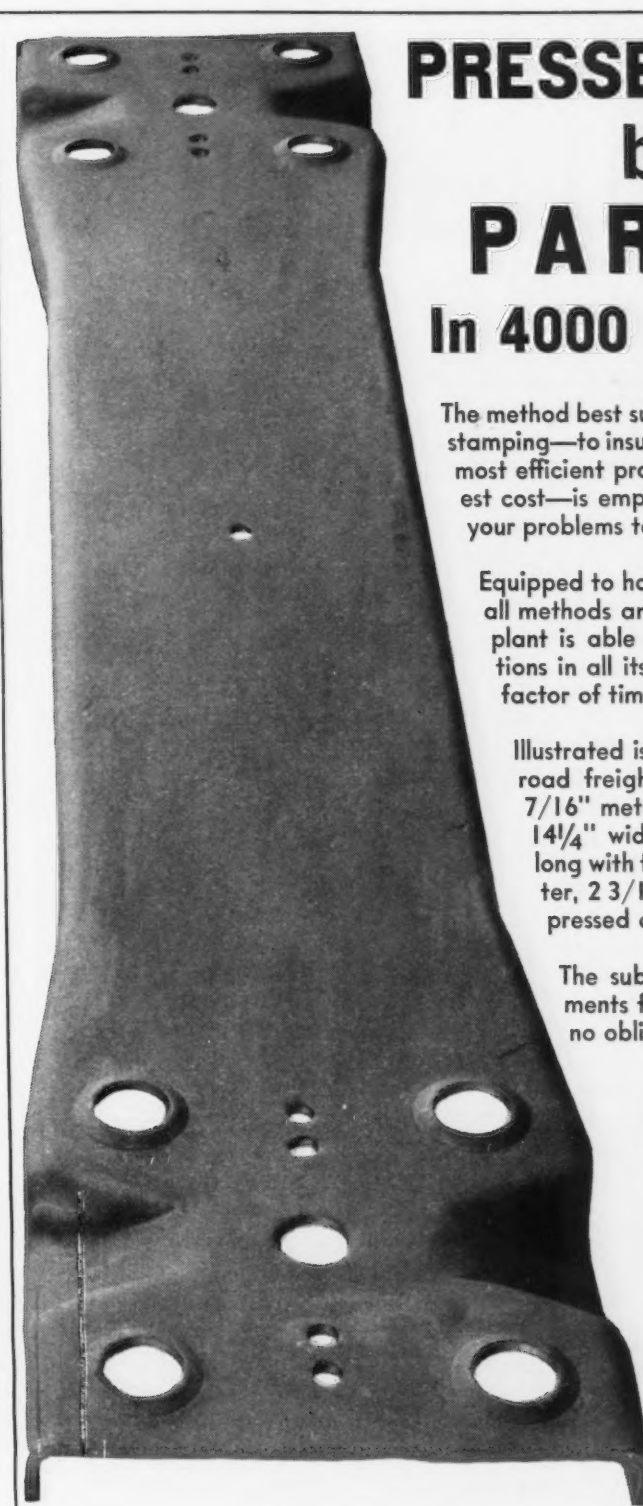
••• With a view to restricting steel supplies entirely to war defense work, orders have been issued, effective immediately, giving a system of complete control over all Canadian warehouse supplies. The items specially under control now are steel plates, blue annealed and black sheets, structural steel (larger than bar mill sizes), and cold-finished steel.

Non-Members Invited to Attend N.I.A.A. Meeting

••• Non-members as well as members are welcome to attend the National Industrial Advertisers Association conference in Toronto from Sept. 17 to 19, the association has announced. The announcement was said to be caused by the large volume of inquiries received by the association

asking whether non-members of the association could attend.

"Non-members are most welcome and may register for the three day period or for one day, as they please," the announcement said. The program of the conference contains many meetings of interest to sales and production men, as well as advertising officials.



PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16 5/8" wide at ends, 14 1/4" wide at center, and 93 1/4" long with flanges 3 3/8" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

PARISH PRESSED STEEL CO.

READING, PENNA.

Pacific Coast Representative
F. Somers Peterson Co.,
57 California St.,
San Francisco, California



4000 Jobs Jeopardized by Cut in Auto Production

Cleveland

••• The present 25 per cent cut in auto production ordered by defense authorities is expected to result in extended lay-offs for nearly 4000 men here, according to an estimate by union officials representing crafts that will be affect-

ed. AFL officials are reported to have protested to Washington against the pending employment dislocation in the automobile industry. Fisher Body Co. representatives estimated that employment on the 1942 production schedule would be limited to 2785 workers as against 3500 employed on 1941 work, meaning a lay-off of about 715 employees.

CAUSPLIT CAN TAKE IT



CAUSPLIT is a new quick-setting cement with amazing chemical and mechanical resistance. It withstands a wide range of strong acids, alkalies and solvents at temperatures up to 350°F.

In addition, it is easy to handle and free from bothersome acid ingredients. Extensive tests have proved Causplit to be first-rate for corrosion-proof construction of industrial equipment. Actually, Causplit is a considerable improvement over Asplit, which has been widely used in many industries for more than 7 years.



CHEMICAL PLANTS: Causplit is the ideal cement not only because of its resistance to hydrofluoric, phosphoric and other strong acid conditions, but also because it is unaffected by alkalies, such as caustic, soda ash and hypochlorites. Causplit naturally stands up under the salts of alkalies and acids in the linings of equipment and floors.



PULP AND PAPER MILLS: Used in pulp digesters and bleaching systems to withstand both acids and alkalies. For instance, it is unattacked by sodium sulphite, sulphurous acid, chlorine, as well as hypochlorite, caustic soda and soda ash. Its characteristics enable it to withstand both mechanical and thermal shocks. Here again Causplit can be used for both tank and floor work.



STEEL MILLS: Causplit is used in the equipment for both acid and alkali cleaning of steels. It is not attacked by hydrochloric and sulphuric acids in the strengths used in the steel industry. It differs from most other acid-proof cements in that it is also resistant to hydrofluoric acid, which is used in the stainless steel industry.

Write or wire us for **FREE TEST KIT**, including samples, booklet of information and test data showing Causplit's resistance to various acids, alkalies and solvents. Pennsylvania Salt Manufacturing Co., Widener Bldg., Philadelphia, Pa.—New York • Chicago • St. Louis • Pittsburgh • Wyandotte • Tacoma.

**PENNSYLVANIA SALT
MANUFACTURING COMPANY**
Chemicals



Assembly Line

(CONTINUED FROM PAGE 70)

they would be locked into position during hauling.

Both Canadian and American defense officials have expressed interest in the possibilities of linking such a coordinated truck-rail system of package units to the cross-ocean transportation system. It is pointed out that the mass arrival of convoyed ships and the massing of freight cars and trucks at the docks creates mammoth problems of loading and unloading. The proposed units could be removed from flatcars or trucks and attached to overhead monorails which would move the packaged unit aboard ship with minimum delay and permit simultaneous loading and unloading by means of the monorail conveyor.

The strange looking, accordion-type units have been designed to carry almost every variety of product, including solids and fluids. They are designed 8 ft. wide and in length as required, can be coupled together and towed into or through factories, like tote boxes on casters platforms.

THERE is an important swing of automobile research facilities from civilian to military problems. K. T. Keller, president of Chrysler Corp., advocated an extension of this practice in his recent suggestion that manufacturers engage in a study of the needs of Army and Navy for military equipment so they could develop new and better types of equipment, rather than waiting for the service groups to do their own development work and then contract for production of the item they have designed.

Chrysler appears to be doing this with the new 500-hp. liquid-cooled tank engine and the 2000-hp. V-16 liquid-cooled airplane engine. General Motors is quietly working on a proposed design for a huge, self-powered high-speed gun. It is understood that this combined weapon and vehicle will travel at speeds of about 60 miles an hour and will be a large bore, high-powered cannon. General Motors already has the Allison engine development to point to as a contribution of this nature. Ford's major design contribution will be the 12-cylinder V-type, liquid-cooled airplane engine which is now undergoing tests.

The concentration of automotive

research on the subject of defense should produce some amazing results. There are more than 200 research laboratories in the United States which have been concerned directly with investigations of automotive vehicles, equipment and accessories. This includes special laboratories devoting all of their work to specific subjects like axles, bumpers, carburetors, chokes, clutches, controls, electrical equipment, engine mufflers, filters, gages, gears, governors, horns, ignition systems, instrument valves, lighting, brake linings, magnetos, instrument panel boards, pistons, radiators, shock absorbers, spark plugs, speedometers, springs, tires, transmissions, water pumps, wheels, windshield wipers, bearings, brakes and engines.

There are about 2200 industrial and commercial laboratories in the United States and between 800 and 900 of these conduct investigations that are related to automotive work, even though not specifically directed in those channels. These include the various metallurgical laboratories and production laboratories investigating steel, alloys, copper, brass, diecasting material, etc. Many of these institutions already are concentrating their attention on defense. In fact, of the four commercial laboratories now engaged in ordnance research, one is an aircraft company, one an automobile company, one a chemical company and the last is a small arms manufacturer, according to the most recent directory "Industrial Research Laboratories of the United States" issued by the National Research Council.

INCIDENTALLY, many of the firms now searching eagerly for information on new materials may be desirous of getting in touch with research investigators who have knowledge of these materials and past experience with them. The directory should prove useful in short-cutting to solutions of some problems. It has a very complete cross-indexing of firms, research experts and technological literature, and includes a subject index which would prove useful in such cases.

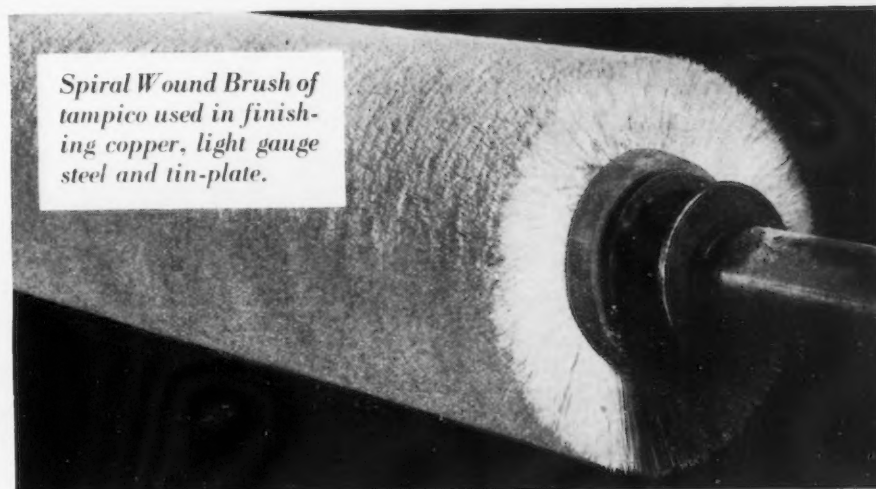
Pretty well authenticated is the rumor that Chrysler made an important contribution to the conservation of aluminum when it redesigned the link belt clips that are to be used for feeding shells in-

to the Bofors anti-aircraft cannon. This Swiss designed cannon made use of diecast aluminum for these clips which, interlocked, form a belt, with the shells serving as the interlocking pins. After use the clips drop off to the ground or into the ocean and are a total loss. Chrysler engineers suggested use of a steel stamping which requires somewhat less labor to fabricate

and will represent a saving of millions of pounds of aluminum, even on small orders.

Because of the Labor Day holiday, automobile production in the first week in September was down to 32,940 passenger cars and trucks, compared with 39,965 in the previous week and 39,665 in the corresponding week of last year, according to Ward's Reports, Inc.

SPIRAL WOUND BRUSHES **Built to Your Order**



Spiral Wound Brush of tampico used in finishing copper, light gauge steel and tin-plate.

● Consult with our engineering representatives. They will gladly work with you in developing Spiral Wound Brushes, of wire, horsehair or tampico, to meet your particular finishing requirements.

"Pittsburgh" Spiral Wound Brushes pay for themselves—many times over!—in the time and money they save. Write or telephone for further information.

**PITTSBURGH
PLATE GLASS COMPANY**

Brush Division · Baltimore, Md.

WAREHOUSES IN 81 IMPORTANT MARKET AREAS



"WE STANDARDIZE ON ELASTUF STEELS FOR OUR DEFENSE WORK . . . SAVING BOTH TIME AND MONEY"

Speed . . . dependability are two important factors in defense work these days. Many a buyer has selected ELASTUF Machinery Steels for this reason—and then found they also saved him money.

The real cost of any Machinery Steel is the cost of the finished, machined, heat-treated part. ELASTUF Steels, even the high tensile alloys, can be

machined to close tolerances and put right to work. They require no further heat treatment. They save both time and costs—yet they cost originally no more than ordinary machinery steels.

Consult your Machinery Steel Selector for the right ELASTUF Steel for your defense contract.

7 OTHER REASONS THAT RECOMMEND ELASTUF STEELS TO YOU.

1. Proven performance.
2. Known physicals.
3. Selection without guesswork.
4. Machinable in ready-for-use condition, eliminating extra heat treatment.
5. A single related group covering all machinery steel uses.
6. Consistent uniformity through controlled production.
7. Available (subject to regulations governing priority) at nearby points.

ELASTUF STEELS



BEALS-McCARTHY & ROGERS • BUFFALO-ROCHESTER
BROWN-WALES CO. • BOSTON, MASS.-LEWISTON, ME.
HORACE T. POTTS CO. • PHILADELPHIA-BALTIMORE

SELECTOR ENDS GUESSWORK

By giving steel data in terms of actual physicals, the Machinery Steel Selector enables you to pick the right steel in any size up to 8" without guesswork. Use your Selector—for another one, write the nearest point listed below.

GOVERNMENT

Government

War Dept., Ordnance:

All Tool Co., Hillside, N. J.; cutters, strippers, spring strippers & tweezers	\$1,640
Allegheny Ludlum Steel Corp., Brackenridge, Pa.; gages	31,175
Allis-Chalmers Mfg. Co., Milwaukee; parts for tractor	2,255
Aluminum Industries, Inc., Cincinnati; shot	3,960,000
American Brass Co., Waterbury, Conn.; bands, hard seamless	52,621
American Locomotive Co., Railway Steel Spring Division, New York; forgings	3,282
American Mfg. Co. of Texas, Ft. Worth, Texas; shells	455,000
American Screw Co., Providence; screws	2,440
American Twist Drill Co., Detroit; tools	2,724
American Type Founders Sales Corp., American Munitions Division, Elizabeth, N. J.; forgings	1,703
B. C. Ames Co., Waltham, Mass.; gages	8,370
Armstrong-Blum Mfg. Co., Chicago; hacksawing machines	4,781
Armstrong Brothers Tool Co., Chicago; drills, hatchet	2,818
G. R. Armstrong Mfrs. Supplies, Inc., New Britain, Conn.; spare parts for carriages	4,125
Artistic Bronze Tablet Co., Inc., Brooklyn; sheet brass	1,444
Associated Attleboro Mfrs., Inc., Attleboro, Mass.; assembly	19,752
Associated Spring Corp., Dunbar Brothers Division, Bristol, Conn.; spring plungers	1,761
Associated Spring Corp., Wallace Barnes Co. Division, Bristol, Conn.; springs, extractor	2,394
Atlas Press Co., Kalamazoo, Mich.; spare parts for lathes	5,041
F. H. Ayer Manufacturing Co., Chicago Heights, Ill.; machines, drilling	7,317
Baird Machine Co., Bridgeport, Conn.; milling machines	32,260
Bakewell Mfg. Co., Los Angeles; machine tapping with equipment	1,547
Baldwin Locomotive Works, Standard Steel Works Division, Philadelphia; forgings	16,160
Barber-Colman Co., Rockford, Ill.; machine, sharpening, with equipment	4,571
cutters	5,563
Barium Stainless Steel Corp., Canton, Ohio; metallic links	4,011,399
Barwood & Co., Philadelphia; gages	11,086
Bay State Tool & Machine Co., Springfield, Mass.; gun parts	66,925
Bearings Co. of America, Lancaster, Pa.; ball bearings	2,219
Bendix Aviation Corp., Eclipse Aviation Div., Bendix, N. J.; parts for tanks	28,223
Bendix Aviation Corp., Scintilla Magneto Division, Sidney, N. Y.; parts for tanks	12,753
Behr-Manning Corp., Troy, N. Y.; gun parts	11,547
Berkeley Equipment Co., Corry, Pa.; machines	7,060
Bethlehem Steel Co., Bethlehem, Pa.; steel	15,461
E. W. Bliss Co., Chicago; presses	3,576
Bliss & Laughlin, Inc., Buffalo; steel	3,640
Boston Gear Works, Inc., Springfield, Mass.; gear pumps	1,372
Botwinik Brothers, Inc., Hamden, Conn.; grinding machines	3,400
Boumans Engineering Co., North Arlington, N. J.; delay firing pins	3,100
Bower Roller Bearing Co., Detroit; cups and cones	5,518

AWARDS

Awards . . .

Bradford Machine Tool Co., Cincinnati; lathes	140,010
Bridesburg Engineering Co., Philadelphia; tools, wrenches, screw drivers, pins, etc.	21,846
Bridgeport Brass Co., Bridgeport, Conn.; brass discs	2,100
Briggs & Stratton Corp., Milwaukee; metal parts for fuze, bomb, nose	1,400
Bristol and Martin Co., New York; gages	2,825
Brown & Sharpe Mfg. Co., Providence; gages	4,460
Buda Co., Harvey, Ill.; parts for tanks	10,587
Budd Wheel Co., Detroit; disc and rim assys.	3,981
Camden Forge Co., Camden, N. J.; steel	20,476
Carnegie Illinois Steel Corp., Pittsburgh; steel	3,582
Carpenter & Paterson Co., Inc., Medford, Mass.; bronze castings	2,915
Carroll-McCreary Co., Inc., Brooklyn; black steel	1,241
Ernest Chandler, New York; tool rolls	3,448
C. B. Christiansen, Newark; fixtures, cutters, belts, ball bearings, pin brakes	2,310
Cincinnati Bickford Tool Co., Cincinnati; drilling machines	2,253
Cincinnati Milling Machine Co., Cincinnati; plain milling machines	13,600
Cincinnati Planer Co., Cincinnati; bevel gears	1,214
Clark Grave Vault Co., Columbus, Ohio; shells	889,100
Cleveland Hardware & Forging Co., Cleveland; forgings	12,896
Clifford-Jacobs Forging Co., Champaign, Ill.; drop forgings	24,112
Columbus Forge & Iron Co., Columbus, Ohio; forgings	9,400
Continental Roll & Steel Foundry Co., E. Chicago, Ind.; set-castings	2,222
Copperweld Steel Co., Warren, Ohio; steel	22,876
Covel Mfg. Co., Benton Harbor, Mich.; grinders, twist drill and wheels, grinding	10,986
Cowles Tool Co., Philadelphia; drill and counterbores	3,366
Crucible Steel Co., New York; steel rods	8,786
for forgings	19,760
steel	10,980
Cuyahoga Spring Co., Cleveland; clip ejectors	6,220
Dalzen Tool & Mfg. Co., Detroit; ground thread taps	49,967
Dana Tool-D Nast Mach. Co., Detroit; twist drills	1,627
C. R. Daniels, Inc., New York; metallic belt link bags	21,038
Detroit Tap & Tool Co., Detroit; gages	15,215
Duplex Mfg. Corp., Sherman, N. Y.; steel chests	14,002
Duro Metal Products Co., Chicago; wrenches	1,200
Edgcomb Steel Co., Philadelphia; forgings for cartridge cases	1,080
Edgewater Steel Co., Pittsburgh; forgings for rings	1,101
Eastern Machine Screw Co., New Haven, Conn.; extruded brass rods	2,848
Efficient Tool & Die Co., Cleveland; jig fixtures	2,840
Equipment Co., Detroit; cutters	4,517
Ever-Tite Mfg. Co., Davenport, Iowa; parts for tanks	82,376
Federal Tool Corp., Chicago; gages	9,752
Fellows Gear Shaper Co., Springfield, Vt.; gear shaper	7,418
Firth Sterling Steel Co., Philadelphia; cases and body dies	2,150



SHORT CUTS FOR SEPARATING MIXED STAINLESS STEELS

Stainless Steels are too precious these days to leave lying around, simply because they cannot be identified. But how can you recover a Stainless Steel that has been mixed with carbon steels . . . with other white metals . . . or with other Stainless grades?

To answer these questions, Frasse has published a table of simple, approximating methods for distinguishing the more popular types of Stainless Steels. The new chart tabulates 8 methods—to separate Stainless from carbon steels, chrome-nickel Stainless from moly

grades, straight chrome from chrome-nickel grades, etc. A detailed explanation of testing methods is included.

This latest Frasse chart is printed on tough cardboard, regular file-card size. It can be filed, tacked on a wall, or slipped under glass to keep it at your fingertips.

A copy of this handy chart is yours for the asking—but the supply is limited. Why not send the coupon today? . . . Peter A. Frasse and Co., Inc.: New York, Philadelphia, Buffalo, Jersey City, Hartford, Baltimore, Rochester and Syracuse.



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Warehouse Distributors

✓SEAMLESS STEEL TUBING ✓STAINLESS STEELS ✓TOOL STEELS
✓WELDED STEEL TUBING ✓SAE ALLOY STEELS ✓MUSIC WIRE
✓COLD FINISHED BARS ✓DRILL ROD ✓C. R. STRIP AND SHEETS



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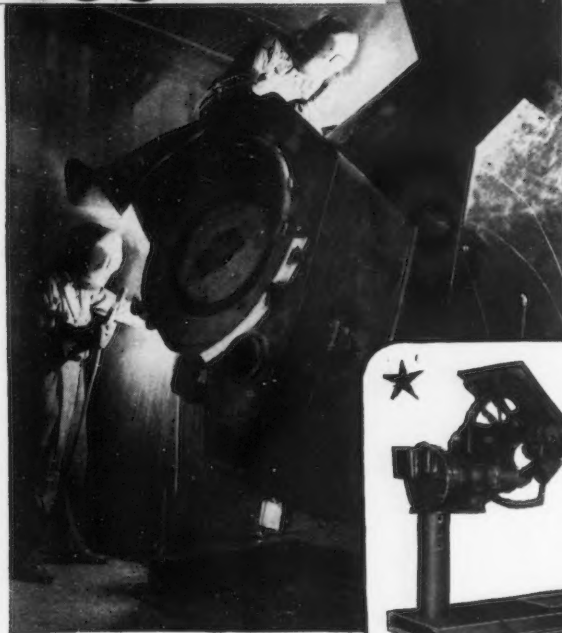
Gentlemen:

Please send me, without obligation, a copy of your latest data chart, Sec. A, No. 3—listing 8 simple methods for distinguishing Stainless Steels.

NAME _____

FIRM _____

ADDRESS _____



PRODUCTION ECONOMY IN DEFENSE WORK

Less handling, more speed and better welding (down-hand at every point) is accomplished on C-F Positioners. Set-up an assembly just once and top, bottom and sides are positioned by rotating 360° and tilting 135°. Table may also be adjusted to various heights for large work.



THIS IS THE MACHINE

A No. 60—3 ton capacity C-F Positioner with many exclusive features designed for fast maneuvering of welding assemblies with safety and economy.

Write today for our informative circular,
WP20 describing welding economy in
production.

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SPRING UNIFORMITY

Laboratory controlled materials and closely maintained production standards make the millionth spring identical with the first in performance



B-G-R springs take to your assembly line like ducks to water.



RCA
SPRINGS
SMALL STAMPINGS
WIRE FORMS

BARNES-GIBSON-RAYMOND

DETROIT PLANT DIVISION OF ASSOCIATED SPRING CORP. COOK PLANT
DETROIT, MICHIGAN ← TWO PLANTS → ANN ARBOR, MICHIGAN

-GOVERNMENT

Charles Fisher Spring Co., Brooklyn; components for guns	95,786
springs	9,827
Fort Dearborn Mfg. Co., Sterling, Ill.; parts for tanks	1,280
Fox Munitions Corp., Philadelphia; gages	4,190
Peter A. Frasse & Co., Inc., New York; elbows, pipe, flanges & tees	2,837
F. A. French, Latrobe, Pa.; percussion primers	15,900
Gallmeyer & Livingston Co., Grand Rapids, Mich.; drill grinder ..	544
Gar Wood Industries, Inc., Detroit; parts for tractors	1,640
General Electric Supply Corp., Springfield, Mass.; electrical equipment	1,118
General Machinery Corp., Niles Tool Works Div., Hamilton, Ohio; equipment for machine tools ...	54,801
General Motors Corp., Delco Brake Division, Dayton, Ohio; automatic screw machines	62,400
General Motors Sales Corp., New Departure Division, Bristol, Conn.; angular ball bearings ..	1,735
General Machinery Corp., Boston; attachments, machine; collets, holders, arbors	2,385
General Printing Ink Corp., Fuchs & Lang Mfg. Co., Philadelphia; grained zinc plates	1,300
General Railway Signal Co., Rochester, N. Y.; shells	4,417,500
Geometric Tool Co., New Haven, Conn.; chasers and heads, die.	1,230
Gilbert & Barker Mfg. Co., West Springfield, Mass.; gun parts ..	40,809
Goddard & Goddard Co., Inc., Detroit; side mills	1,792
George Gorton Machine Co., Racine, Wis.; duplicators and milling machines	12,813
Gould & Eberhardt, Irvington, N. J.; hobbing machine	7,999
Grant Oil Tool Co., Los Angeles, Cal.; projectors, smoke shell ..	462,884
Greenfield Tap & Die Corp., Greenfield, Mass.; gages	39,587
Hadley Special Tool Co., Inc., Boston; gun parts	36,366
Hampden Electric Supply Co., Springfield, Mass.; steel conduit ..	2,235
Handy Governor Co., Ann Arbor, Mich.; parts for tanks	8,002
Harrington & King Perforating Co., Chicago; tubes for tanks ..	1,086
Charles E. Hayes Co., Springfield, Mass.; single conductor cable ..	1,291
Hendey Machine Co., Torrington, Conn.; machine tools	69,330
Joseph Horat, Lafayette, Ind.; lead hammers	2,479
E. Horton & Son Co., Windsor Locks, Conn.; mill jaws	1,159
A. E. Hunt Steel Co., Boston; steel Illinois Tool Works, Chicago; end milling cutters	1,987
milling cutters	1,382
Ingersoll Milling Machine Co., Rockford, Ill.; grinders	1,443
International Engineering Works, Framingham, Mass.; steel disks ..	1,800
International Machine Tool Corp., Indianapolis; equipment for turret lathes	432,008
Johnson Claffin Corp., Marlboro, Mass.; gages	11,115
Jones & Lamson Machine Co., Springfield, Vt.; thread chasers ..	1,180
Jones & Laughlin Steel Corp., Aliquippa, Pa.; shells	5,126,500
Joslyn Mfg. & Supply Co., Chicago; shot	13,974
Kearney & Trecker Corp., Milwaukee; milling machines	40,868
Keenan Supply Co., Inc., Philadelphia; fixtures, air vent and equipment	1,307
Kent Aircraft & Machine Tool Co., Camden, N. J.; gages	11,489
Walter Kidde & Co., New York; fire extinguishers	3,948
King Machine Tool Co., Cincinnati; vertical boring mill ..	31,202

AWARDS

Kobe, Inc., Huntington Park, Cal.; gages	2,304
A. B. Landis Sons, Inc., Wyndmoor, Pa.; punches, posts, segments	6,320
Landis Tool Co., Waynesboro, Pa.; machine grinding	45,346
Larkin Packer Co., Inc., David Boring Tool Div., St. Louis; tools, small cutting	8,115
LaSalle Steel Co., Hammond, Ind.; steel	7,008
Latrobe Electric Steel Co., Latrobe, Pa.; steel	7,094
LeBlond Machine Tool Co., Cincinnati; drilling machines	2,117,501
Lewis-Shepard Sales Corp., Watertown, Mass.; trucks, lift and equipment	1,230
Liberty Tool & Die Corp., Rochester, N. Y.; fixtures	2,042
Lincoln Park Tool & Gage Co., Lincoln Park, Mich.; gages	16,408
Lindsley Manufacturing Co., Inc., Milford, Conn.; gages	28,303
Link Belt Co., Indianapolis; shot	13,440
Linley Brothers Co., Bridgeport, Conn.; machine tools	4,999,850
Lite Mfr. Co., Philadelphia; assemblies	8,301
Logansport Machine Co., Inc., c/o Wm. Battersby, Philadelphia; chucks	167,000
Magnaflux Corp., Chicago; machines, inspection	4,010
McDonough Manufacturing Co., Eau Claire, Wis.; grinders	2,943
McEvoy Co., Houston, Texas; mounts, tripod, machine guns	1,420
Mechanical Laboratories, Inc., Pittsburgh; gages	154,561
Merco Co., Los Angeles; gages	1,280
Mercury Mfg. Co., Chicago; truck Minster Machine Co., Minster, Ohio; presses	20,930
Modern Tool & Die Co., Philadelphia; gages	4,091
Monarch Machine Tool Co., Sidney, Ohio; lathes	3,536
Multi-Products Tool Co., Newark; bases, punch guides, anvils, punches & locating disks	4,684
Murray Co., Atlanta; shells	70,298
National Enameling & Stamping Co., Granite City, Ill.; cartridge cases	3,525
National Lock Washer Co., Newark; rough forgings	162,000
Nelpin Manufacturing Co., Long Island City, N. Y.; gages	1,294,650
New York Thread Grinding Corp., New York; gages	3,346
Nice Ball Bearing Co., Philadelphia; thrust bearings	2,925
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford; lathes	18,618
reamers	4,330
gages	8,207
Ny-List Tool & Mfg. Co., Rockford, Ill.; grinding machines	1,800
L. Offerman Co., New York; gages	5,857
Otis Elevator Co., Buffalo; steel castings	19,200
Otis Steel Co., Cleveland; steel	4,900
Peck Electric Supply Co., Troy, N. Y.; conduit steel	1,300
Penn Instrument Co., Philadelphia; gages	20,153
Pittsburgh Steel Foundry Co., Glassport, Pa.; steel castings	1,082
Poldi Steel Co., Inc., Chicago; tool bits	2,880
Pope Trading Corp., New York; pig tin	11,566
Precise Tool & Mfg. Co., Farmington, Conn.; gages	3,605
Precision Mfg. Co., New York; gages	11,098
Precision Tool & Manufacturing Co., Farmington, Mich.; gages	5,380
Quality Tool & Die Co., Indianapolis; gages	33,799
Racine Tool & Machine Co., Racine, Wis.; machines, sewing, hydraulic	3,560
	7,470
	2,680



Where seconds count—

The smooth-acting positive control of air operated equipment that you get with Hannifin Air Control Valves makes control easier, helps keep up continuous production. These valves have the bronze disc controlling air flow ground and lapped to make a perfect seal with the seat, which is similarly finished. There is no packing, and no leakage or packing maintenance troubles.

Hannifin Air Control Valves are made in 3-way and 4-way types, hand and foot operated, manifold, spring return, heavy duty rotary, electric and special models. Write for Valve Bulletin 34-A.

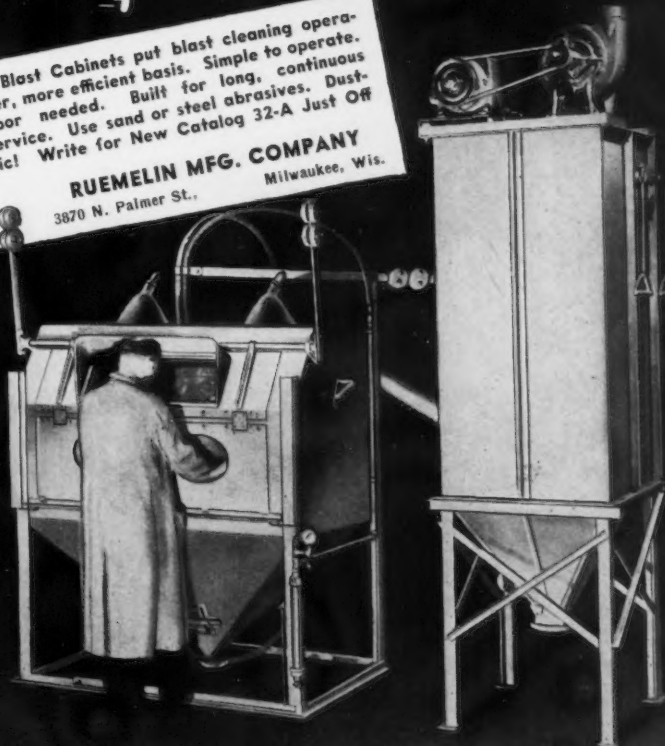
HANNIFIN MANUFACTURING COMPANY • 621-631 So. Kolmar Ave., Chicago, Ill.
ENGINEERS • DESIGNERS • MANUFACTURERS • DOUBLE-ACTING PNEUMATIC AND HYDRAULIC CYLINDERS, ALL SIZES

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AIR CONTROL

Speed up **SAND BLASTING**

Ruemelin Sand Blast Cabinets put blast cleaning operations on a faster, more efficient basis. Simple to operate. No skilled labor needed. Built for long, continuous trouble-free service. Use sand or steel abrasives. Dustless! Hygienic! Write for New Catalog 32-A Just Off the Press.

RUEMELIN MFG. COMPANY
3870 N. Palmer St., Milwaukee, Wis.



RUEMELIN Blast Cleaning Cabinets

GOVERNMENT AWARDS

Rahain Machine & Tool Co., Gardner, Mass.; gages	2,438
Read Machinery Co., Inc., York, Pa.; parts for mortars	1,143
Regina Corp., Rahway, N. J.; fuzes	548,895
Rehnberg-Jacobson Manufacturing Co., Inc., Rockford, Ill.; machine, needle bearing	2,083
Reliable Tool Co., Irvington, N. J.; cutters, strippers, spring strippers & shank & punches ..	1,990
Reliance Steel Casting Co., Pittsburgh; steel castings	4,264
Remington Arms Co., Inc., Bridgeport, Conn.; primers	1,500
Republic Steel Corp., Cleveland;	

steel	26,504
barrel blanks	3,577
Revere Copper & Brass, Baltimore; sheet copper	1,271
E. F. Roberts Co., Philadelphia; install and cover pipe mains ..	16,750
Rolock, Inc., Southport, Conn.; pickling baskets	22,680
Joseph T. Ryerson & Son, Inc., Chicago; steel	1,017
Saginaw Stamping & Tool Co., Saginaw, Mich.; trailers, bomb.	171,909
Scullin Steel Co., St. Louis; components for bombs	17,560
Sheffield Gage Corp., Dayton, Ohio; gages for panoramic telescopes	5,009

Sipp-Eastwood Corp., Paterson, N. J.; steel	1,742
SKF Industries, Inc., Philadelphia; roller bearings	9,132
Somerville Machine & Foundry Co., Somerville, Mass.; castings, manganese bronze	1,279
Standard Gage Co., Inc., Poughkeepsie, N. Y.; gages	6,114
Standard Steel Spring Co., Blood Brothers Machine Co. Division, Allegan, Mich.; flexible joints ..	4,528
Star Cutter Co., Detroit; tools ..	158,966
Steel Improvement & Forge Co., Cleveland; forgings	9,345
F. J. Stokes Machinery Co., Philadelphia; punch holders & die holders	1,760
B. F. Sturtevant Co., Hyde Park, Mass.; fans, pressure, ventilating	2,002
Suburban-Essex Machinists, Inc., Orange, N. J.; gages	22,462
Summerill Tubing Co., Bridgeport, Pa.; steel tubing	8,422
Sunnen Products Co., St. Louis; machines, honing	9,760
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.; forgings ..	260,000
Thompson Products, Inc., Detroit; fuze adapters	43,023
Titeflex Metal Hose Co., Newark; tubing and conduit	4,505
Torrington Co., Torrington, Conn.; bearings	1,959
Samuel B. Townsend Lawnmower Co., Bloomfield, N. J.; shells ..	359,060
Thurston Mfg. Co., Providence; end mills	2,165
J. C. Ulmer Co., Cleveland; fixtures, jugs, drill	1,962
Union Steel Chest Corp., LeRoy, N. Y.; steel chests	39,701
cutters	1,446
Unique Specialties, Inc., New York; cutters, strippers, stripper springs, toggle arms & rivets ..	3,462
set back pins for fuze	13,083
United Specialties Co., Philadelphia; magazine assemblies and sub-machine guns	767,112
U. S. Tool & Manufacturing Co., Dearborn, Mich.; cutters, steel milling, misc.	1,938
Universal Castings Corp., Chicago; aluminum bronze castings	1,110
Universal Cyclops Steel Corp., Titusville, Pa.; steel	1,447
Universal Metal Products Co., Inc., New York; gun parts	34,654
Van Dorn Electric Tool Co., Towson, Md.; machine tools	4,472
Vanadium Alloys Steel Co., Latrobe, Pa.; tool steel	5,343
Vascoloy-Ramet Corp., Chicago; tools	1,997
form tool for cartridge cases ..	4,385
Veit & Young, Philadelphia; punches and dies	8,095
John Verduin Machine Corp., Paterson, N. J.; machines ..	9,000
Vickers, Inc., Waterbury Tool Division, Waterbury, Conn.; gears	310,000
Vinco Corp., Detroit; gages	9,040
Vortex Mfg. Co., Claremont, Cal.; parts for tanks	1,104
Weidemann Machine Co., Philadelphia; gages, shell	3,852
Wel-Ever Piston Ring Co., Toledo, Ohio; fuze, dummy	12,892
Weldon Tool Co., Cleveland; cutters	2,807
West & Dodge Thread Gage Co., Inc., Boston; gages for panoramic telescopes	1,085
White Motor Co., Cleveland; parts for scout car	20,815
Whitman & Barnes, Detroit; oil hole drills	1,473
Wiedemann Machine Co., Philadelphia; gages	5,756



CROSS

UNIVERSAL

Milling Machine

The No. 20 Cross is a Universal Milling Machine with a cutter spindle adjustable to any angle in any plane. Many features make it the ideal machine for a variety of work including: contour profiling, die sinking, angular milling, jig boring, routing of non-ferrous materials, automatic milling, etc.

Literature upon request.



CROSS GEAR & MACHINE CO

Established in 1898

DETROIT, MICHIGAN, U.S.A.

GOVERNMENT AWARDS

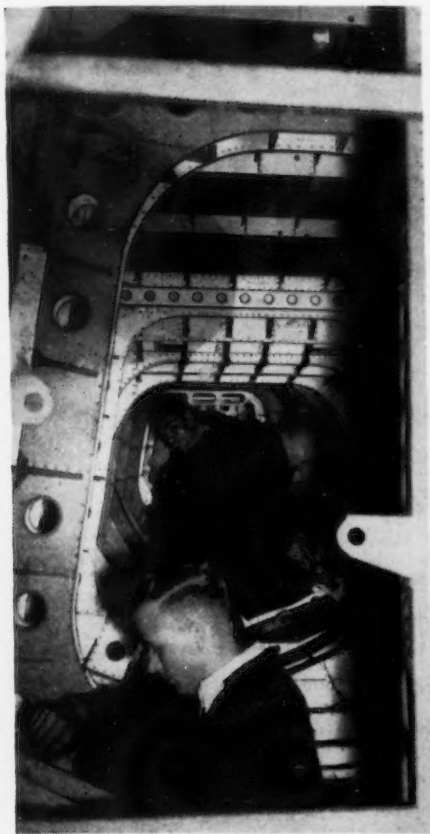


Photo by British-Combine

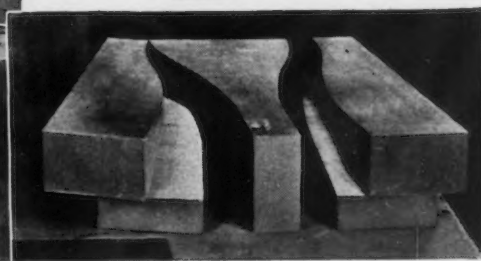
SARO FLYING BOAT: These men are at work inside the hull of a Saro flying boat, a type of plane used by the British Fleet air arm. The boats are used constantly on reconnaissance work.

Caterpillar Tractor Co., Peoria, Ill.; tractors	12,785
graders	10,568
Chicago Flexible Shaft Co., Chicago; forges, small hammer ...	3,108
Chicago Pneumatic Tool Co., St. Louis, Mo.; electric drills and drill jigs, Fort Crook Aircraft Assembly Plant, Neb.	75,877
compression riveters	10,000
compressors, engine parts, etc...	28,514
Chicago, Rock Island and Pacific Railway Co., Chicago; turnouts.	4,672
Cincinnati Tool Co., Norwood, Cincinnati; clamps, siderail; clamping handles and screws, bearing	

plates and swivel pins	26,435
Columbian Steel Tank Co., Kansas City; water tanks	4,050
Consolidated Steel Warehouse, Philadelphia; structural steel ..	9,347
steel	31,360
Continental Machines, Inc., Minneapolis; contour saw and filing machines and accessories, Aircraft Assembly Plant, Tulsa, Okla.	3,954
A. D. Cook, Inc., Lawrenceburg, Ind.; pumping sets	5,607
Coolerator Co., Duluth; material racks, Aircraft Assembly Plant, Ft. Crook, Neb.	8,983



METAL SAWING
IS DUCK SOUP
FOR THE
DoAll



On the DoAll, the Hawthorne Metal Products Co., Detroit, Mich., cut the five sections of a die from one block of boiler plate steel 5" thick, 16" long, 14" wide—only 4 cuts of the saw necessary. Time—1¾ hours for each cut, or at the rate of ¼" per minute. Saw used—½" 6 R.H. Speed—150 f.p.m.

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The DoAll is the machine tool that is effecting unprecedented savings wherever installed, in machine shops, tool rooms, automobile and truck factories, railroad and aeroplane plants, arsenals and shipyards, etc.

The DoAll is an all-purpose machine—does internal and external band filing, sawing and polishing on any kind of metal or alloy. Handles work at various angles.

Let us send a factory trained man to your plant with a DoAll to show you how a DoAll will handle your cutting jobs.

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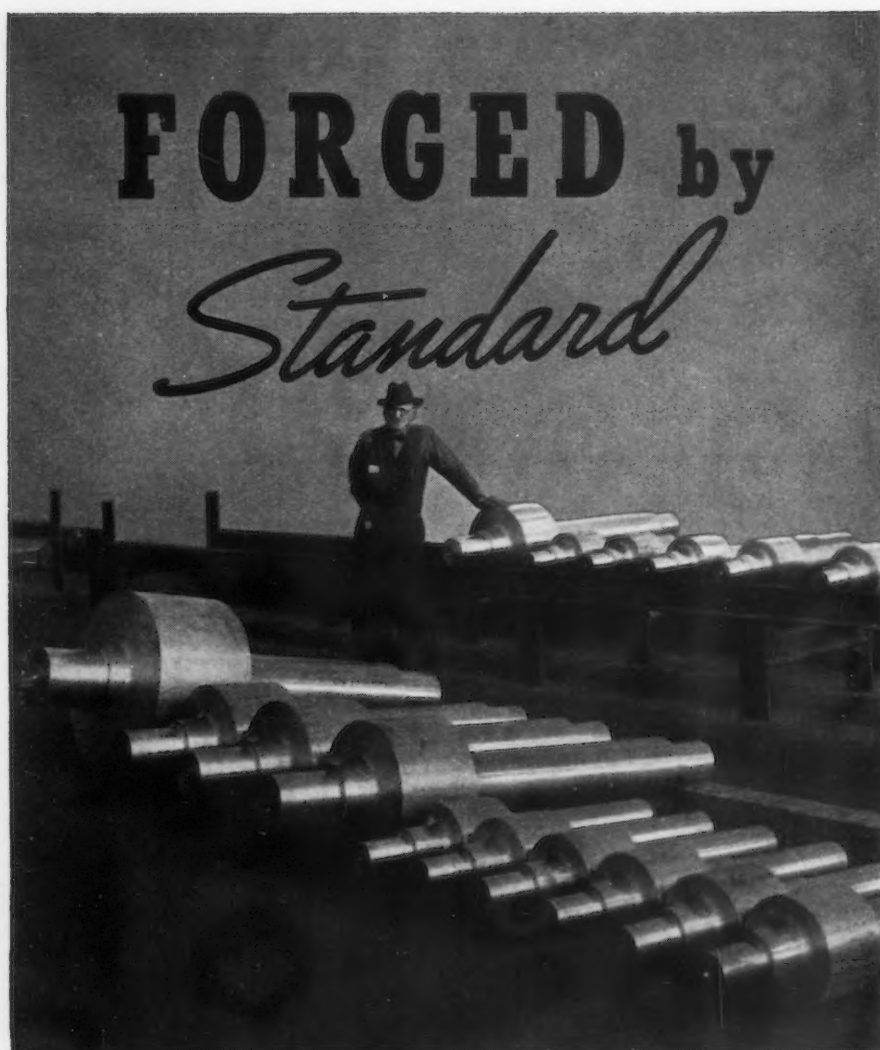
Associated with the DoAll Company, Des Plaines, Ill., Manufacturers of Band Saws and Band Files for DoAll Contour Machines.



J. H. Williams & Co., Buffalo; forgings for guns	2,368
Alan Wood Steel Co., Conshohocken, Pa.; steel floor plates..	1,826
Yoder Co., Cleveland; shells	486,400
Youngstown Sheet & Tube Co., Youngstown, Ohio; steel	1,413
Zimmerman Steel Co., Bettendorf, Iowa; steel castings	10,213

War Dept., Corps of Engineers:

Albert Pipe Supply Co., Inc., Brooklyn; galvanized wrought iron pipe	\$7,320
Allis-Chalmers Mfg. Co., Springfield, Ill.; loaders	36,328
American Blue Print Co., Inc., New York; scale, engineer's, triangular	10,480
American Car and Foundry Co., Berwick, Pa.; railroad cars ...	23,500
Baker - Raulang Co., Cleveland; tractors	2,950
Barber-Greene Co., Aurora, Ill.; truck loaders	49,872
ditchers	22,275
S. Blickman, Inc., Weehawken, N. J.; coffee urn batteries, Scott Field, Ill., and Jefferson Barracks, Mo.	10,237
Buffalo - Springfield Roller Co., Springfield, Ohio; rollers with spare parts	22,231
C. H. & E. Mfg. Co., Milwaukee; pumping sets	5,465
J. I. Case Co., Racine, Wis.; parts for engines	2,153
tractors	26,138



For more than half a century **STANDARD** has been meeting the requirements of industry for high quality, unusual shape, and close tolerances in forged steel parts.

The steel used is acid open hearth produced in Standard's furnaces under the close metallurgical control of a trained engineering staff.

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THE MIDVALE COMPANY • CRAMP BRASS AND IRON FOUNDRIES DIVISION



GOVERNMENT AWARDS

Crown Iron Works Co., Minneapolis; reels, wire, with stand, electric lighting equipment	15,750
Davenport Besler Corp., Davenport, Iowa; locomotives	64,050
Eugene Dietzgen Co., Inc., Chicago; levels, and transits	16,890
Dobbie Foundry & Machine Co., Niagara Falls, N. Y.; steel derricks	9,500
E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; blasting caps and tamping bags	40,550
Eagle Crusher Co., Inc., Galion, Ohio; repair parts for crushers	3,445
Fries, Beall & Sharp Co., Washington; wheelbarrows	27,180
Gates Hardware Co., Inc., Tulsa, Okla.; screw drivers, Aircraft Assembly Plant, Tulsa, Okla.	3,525
rotary air drills	3,225
General Electric Co., Washington; welders	6,461
General Motors Corp., Chevrolet Division, Detroit; pick-up trucks	2,572
Gillen Woodwork Corp., Milwaukee; chests, electric lighting equipment	40,159
Hamilton-Huster Machinery Co., Dallas; disk grinders, Aircraft Assembly Plant, Tulsa, Okla.	3,915
C. V. Hill & Co., Inc., Trenton, N. J.; refrigerator boxes and condensing units	3,244
Hobart Brothers Co., Troy, Ohio; welding outfits	4,828
Hospital Supply Co., and Watters Laboratories, Consolidated, New York; steam jacketed disinfectors, Scott Field, Ill.	2,226
Frank G. Hough Co., Libertyville, Ill.; sweepers	2,043
Hudson Supply & Equipment Co., Washington; pump unit, centrifugal	14,362
Independent Pneumatic Tool Co., Aurora, Ill.; spare parts for air tools	27,808
Ingersoll-Rand Co., Athens, Pa.; pneumatic drills and hammers	2,886
International-Stacey Corp., Columbus, Ohio; towers, searchlights	23,466
Iron City Tool Works, Pittsburgh; quarry picks	15,200
Jaeger Machine Co., Columbus, Ohio; hoists, double drum	11,794
Johnson Motors, Division of Outboard Marine and Mfg. Co., Waukegan, Ill.; outboard motors	6,079
Keuffel & Esser Co., Hoboken, N. J.; plotting scales	5,580
Kilby Steel Co., Anniston, Ala.; screw posts	62,780
Koehring Co., Milwaukee; parts for trail-dumps	4,145
LaCrosse Trailer & Equipment Co., LaCrosse, Wis.; semi-trailers and dollies	3,202
trailers	25,392
R. G. LeTourneau, Inc., Toccoa, Ga.; rooters, scrapers, rooler, sheepsfoot	22,066
Max Levy & Co., Philadelphia; screen, half tone	5,560
Lite Mfg. Co., Newark; tanks, canvas, storage	14,640
Littleford Bros., Cincinnati; rollers	4,900
Machinery Sales & Supply Co., Dallas, Texas; single surface planer, Aircraft Assembly Plant, Tulsa, Okla.	3,000
Mall Tool Co., Chicago; repair parts for saws	5,345
Marshall Supply & Equipment Co., Tulsa, Okla.; Fitchburg "bath" and universal grinder accessories, Aircraft Assembly Plant, Tulsa, Okla.	6,314
scrugun	2,035
electric drills	4,650

GOVERNMENT AWARDS

drilling machines and accessories	11,760
drill presses and accessories	5,741
jig boring machine and accessories	8,936
lathes	10,543
McArdle Equipment Co., Houston; engine lathes and accessories, Aircraft Assembly, Tulsa, Okla.	11,071
Midwest Steel & Iron Works Co., Denver; structural steel, Lowry Field, Denver, Colo.	5,074
New England Power Co. and New England Power Service Co., Massachusetts; relocation of transmission and telephone lines and right of way, Birch Hill Dam, Worcester County, Mass.	35,503
Osgood Co., Marion, Ohio; shovels, gasoline engine driven	179,604
Parker Appliance Co., Cleveland; tube benders and accessories, Aircraft Assembly Plant, Tulsa, Okla.	7,211
Paving Supply and Equipment Co., Springfield, Ohio; tandem rollers	5,499
heaters	7,430
Peerless Pump Division, Canton, Ohio; pumping sets	3,664
Pennsylvania Railroad Co., Philadelphia; construction of railroad sidings and extension of company's track, Cape Henlopen and Lewes, Del.	24,573
H. K. Porter, Inc., Everett, Mass.; wire cutters	24,450
Ransome Concrete Machinery Co., Dunellen, N. J.; concrete mixers	9,953
Reynolds Wire Co., Dixon, Ill.; copper wire cloth	6,732
Rogers Brothers Corp., Albion, Pa.; trailers	7,955
J. G. Saltzman, Inc., New York; printers, photographic	2,525
Schramm, Inc., West Chester, Pa.; air compressors	6,900
Sheriff Motor Co., Washington; tractor-type trucks	13,781
Shovel Supply Co., Dallas; rollers	2,600
Snow Removal Equipment Co., San Francisco, Cal.; snow plows	14,416
Sullivan Machinery Co., Michigan City, Ind.; drills and equipment	23,822
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; bolts, track, plates, tie	4,743
Trailer Co. of America, Cincinnati; parts for semi-trailers	6,745
Vulcan Iron Works, Wilkes-Barre, Pa.; locomotives	63,975
Wallace & Tiernan Co., Inc., Belleville, N. J.; spare parts for water purification units	5,860
water purification units	231,055
Wheeling Steel Corp., Benwood, W. Va.; black pipe	4,420
pipe	15,704
Whitcomb Locomotive Co., Rochelle, Ill.; locomotives	127,660
Willborn Bros. Co., Inc., Amarillo, Texas; steel tanks	4,920
Wood Shovel and Tool Co., Piqua, Ohio; shovels	4,040
York Ice Machinery Corp., York, Pa.; refrigeration units	47,873

War Dept., Air Corps:

Aircraft Fitting Co., Cleveland; items of fittings	\$57,615
Allith-Prouty, Inc., Danville, Ill.; shoring assemblies airplane	285,300
Aluminum Company of America, Washington; rivets	431,085
Bendix Aviation Corp., Bendix Products Division, South Bend; carburetors & spare parts	130,652
Bendix Aviation Corp., Scintilla Magneto Division, Sidney, N. Y.; spare parts for magnetos	125,875

A METALLIZING JOB THAT WHEELABRATING MADE POSSIBLE!

FOR many years leather shoes have been built over wooden lasts. In some respects wood is a good material to use for this purpose, because the insole of the shoe can be tacked to it, and the material is relatively inexpensive. But there are several disadvantages: For instance, wood splits rather easily; it does not maintain a constantly uniform size; and it warps.

HIGH MORTALITY OF WOOD LASTS

When any one of these incidents occurs—and it does very frequently—the last must be replaced and that, of course, is expensive. To get around this difficulty the George C. Clark Metal Last Co., Mishawaka, Indiana, decided to experiment with a metal last similar to the one they had been producing for manufacturers of rubber footwear.

PROBLEMS INVOLVED IN THE USE OF A METAL LAST

Unlike rubber footwear, however, leather shoes have to be tacked to the last. The first problem, therefore, in designing the new product, was to provide a tacking surface for the insole. Magnesium was chosen for the last proper, because of its lightness and durability. The use of this metal, however, brought up this problem: When nails were driven into the magnesium it was not possible to pull the shoe from the last. When a wood last is used the nails penetrate into the surface, but they pull out easily when the shoe is removed.

To overcome this problem, some means had to be provided to bend the nails over after they were driven through the sole, instead of permitting them to penetrate into the metal. A hard metal plate was first suggested, but the difficulty of fastening it to the metal last made the idea impractical.

METALLIZING EXPERIMENTS

The next idea—and the one which finally solved the problem—was to metallize a thin coating of carbon steel on the sole.

At the same time a clever arrangement was worked out to provide tacking points for the leather insole. The mold in which the metal last is cast is fitted with small bosses at three points on the sole. After the metallizing operation, these places are drilled out and plugged with a composition of rubber and leather. It is these that provide the tacking points.

The first attempt at metallizing failed, because it was impossible to obtain a perfect bond between the two metals. An attempt to roughen the sole by various blasting and grinding methods in order to get the right bond proved fruitless, too.

The problem was finally given to us for study. Samples were sent to our laboratory and, after some preliminary testing, a successful job of roughening was accomplished by blasting the last with No. 18 metallic grit in a WHEELABRATOR Multi-Tablast.

After WHEELABRATING, the lasts are transferred immediately to the metallizing spray booth and the soles are coated with a thin film of metal.

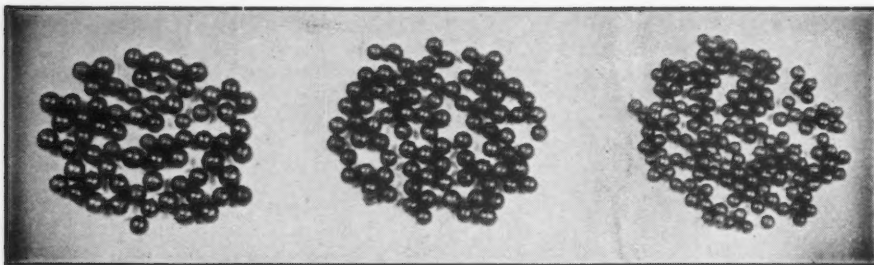
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WHEELABRATORS
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HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

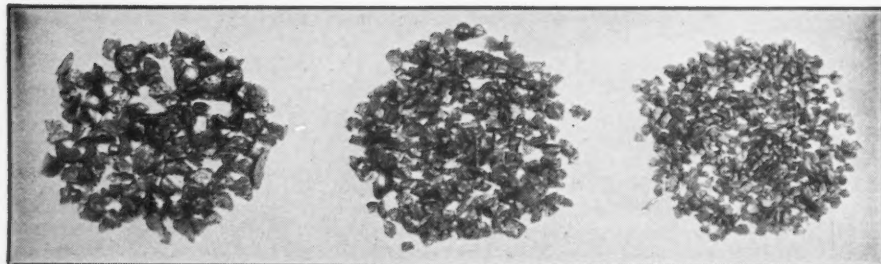
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

HEAT-TREATED STEEL GRIT

MANCHESTER, NEW HAMPSHIRE



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STEELS**

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GOVERNMENT

assys.	216,290
items of parts	291,712
Breeze Corp., Inc., Newark; flow- meters	286,380
Butler Manufacturing Co., Kansas City, Mo.; prefabricated porta- ble warehouses	259,308
Chicago Pneumatic Tool Co., De- troit, Mich.; pneumatic ham- mers, riveters	124,464
Freuhauf Trailer Co., Detroit; semi-trailers	126,470
B. F. Goodrich Co., Akron, Ohio; threaded rivets	56,802
Hayes Industries, Inc., Jackson, Mich.; wheel assemblies	83,758
Holley Carburetor Co., Detroit; Mich.; carburetors	90,682
Jack & Heintz, Inc., Cleveland; maintenance parts for starters, starter assys.	227,480 7,833,800
Magnavox Co., Inc., Fort Wayne, Ind.; solenoid assemblies	128,826
Parker Appliance Co., Cleveland; benders, tube, hand and flaring tools	74,391
Peck, Stow & Wilcox Co., South- ington, Conn.; brakes & folders; holders and shears	92,531
Pump Engineering Service Corp., Cleveland; pump assemblies with valve	137,900
Seifreut-Elstad Machinery, Dayton, Ohio; formers, machines and shears	95,114
Sharpville Steel Fabricators, Inc., Sharpville, Pa.; tanks	418,400
Standard Steel Works, North Kan- sas City; stand assemblies	459,000
Staynew Filter Corp., Rochester, N. Y.; carburetor air intake fil- ters	96,774
United Aircraft Products, Inc., Dayton, Ohio; bearings & rod end assemblies	69,844
Vultee Aircraft, Inc., Downey, Cal.; adapter assemblies	292,460
Westinghouse Electric & Manufac- turing Company, Pittsburgh; oxygen flow indicators	85,733
Wright Aeronautical Corp., Pater- son; tools	145,965

War Dept., Quartermaster Corps:

Aluminum Cooking Utensil Co., New Kensington, Pa.; 21,609 ea. cooking utensils	\$100,515
Aluminum Goods Mfg. Co., Mani- towoc, Wis.; 130,000 ea. canteens	54,600
Autocar Co., Ardmore, Pa.; trac- tor-trucks, 4-5 ton	59,007
Bendix Aviation Corp., New York; steering stabilizers and brackets	4,200
Chrysler Corp., Detroit; spare parts for truck	383,874
Cover Stamping & Mfg. Co., Cam- bridge, Mass.; 2,550 ea. pans, tin, cake	1,657
Equitable Equipment Co., Inc., New Orleans; steel tugs	518,000
General Motors Co., Chevrolet Di- vision, Detroit; trucks, ½ ton and chassis, ½ ton.	36,428 31,732
General Motors Truck and Coach Division of Yellow Truck and Coach Mfg. Co., Pontiac, Mich.; spare parts for trucks.	98,047
Haggard & Marcusson Co., Chi- cago; 100,000 folding steel cots.	332,950
Heil Co., Milwaukee; truck bodies	11,437
Mack Mfg. Corp., Plainfield, N. J.; spare parts and service tools for wreckers	57,447
Nelson and Paul, Salt Lake City; chain link fencing, Utah General Depot	11,775
C. S. Osborne & Co., Harrison, N. J.; 2,994 ea. — component parts for tool-sets	2,967

AWARDS

G. E. Prentice Manufacturing Co., New Britain, Conn.; 600,000 ea. web strap buckles	29,400
Rex Products Corp., New Rochelle, N. Y.; 1,515,000 ea. end clips..	5,363
Sanitary Refrigerator Co., Fond du Lac, Wis.; 50,000 folding steel cots	165,000
Shott Manufacturing Co., Cincinnati; 40,000 folding steel cots..	132,000
Smith & Davis Manufacturing Co., St. Louis; 50,000 folding steel cots	168,000
Tuller Construction Co., Red Bank, N. J.; motor repair shops, Fort Meade, Md.	22,840
S. Weinstein Supply Co., New York; 210 ea.—component parts for tool-sets	134
Welker Manufacturing Co., Inc., Cromwell, Conn.; 907,500 ea. component parts for belts, web waist, buckles	39,930
White Motor Co., Cleveland; spare parts for trucks	26,259
Willys-Overland Motors, Inc., Toledo, Ohio; trucks, 1/4-ton	1,946,717
Winter-Weiss Co., Denver; semi-trailers	87,882

War Dept., Medical:

Anchor Products Co., Chicago; surgical needles	\$51,850
Becton, Dickinson & Co., East Rutherford, N. J.; surgical instruments	9,431
Central Dental Mfg. Co., Louisville, Ky.; engines, foot	25,382
Wm. Langbein & Bros., Brooklyn; knives	12,555
Oneida, Ltd., Sherrill, N. Y.; forceps	26,997
Geo. P. Pilling & Son Co., Philadelphia; tubes	5,035
Rex Cutlery Corp., Irvington, N. J.; scissors	36,850
Theodore E. Schneider, South Norwalk, Conn.; scissors	35,170
George Tiemann & Co., Brooklyn; scissors	750
Torsion Balance Co., Jersey City; prescription scales	18,150
S.S. White Dental Mfg. Co., Staten Island, N. Y.; dental burs.....	40,776
dental equipment	112,263
Witt Cornice Co., Cincinnati; galvanized iron cans	8,664

War Dept., Coast Artillery Corps:

American Auto. Elec. Sales Co., Chicago; switches	\$2,084
Merrill Brothers, Maspeth, N. Y.; shackles	7,394
Arthur J. O'Leary & Son, Chicago; rings	2,048
Nutting Truck & Caster Co., Fairbault, Minn.; dollies, steel frame	3,991
S. G. Taylor Chain Co., Hammond, Ind.; rings	440

War Dept., Chemical Warfare Service:

Firestone Tire & Rubber Co., Fall River, Mass.; canister and carrier assays	\$423,355
Salta Corp., Bedford, Va.; outlet valves	4,233

Defense Plant Building:

Air Cruisers, Inc., Clifton, N. J.; facilities for mfr. of barrage balloons	\$253,942
Chrysler Corp., Detroit; machinery and equipment for mfr. of aircraft parts	403,022
Jack & Heintz, Inc., Cleveland; plant for mfr. of airplane starters	146,089
Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.; facilities for mfr. of radio-grade parts	320,699

GUSHER COOLANT PUMP

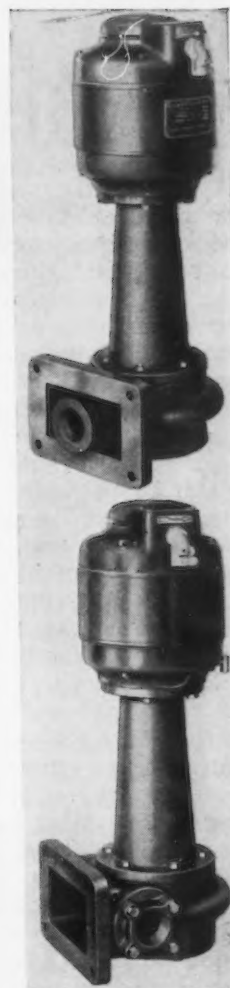
Every Tool Engineer Recognizes

Every tool engineer recognizes the coolant pump as an important part of his tooling-up plans.

Many tool engineers prefer Ruthman Gusher Coolant Pumps because these pumps need no priming and are ready to deliver the desired volume at the snap of the switch. There are no packings to fuss with, and grit cannot clog the Gusher impeller Coolant Pump. That means there will be no interruption in production so far as coolant supply is concerned.

The
RUTHMAN
Machinery Company

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To produce the highest quality of perforated metal as used in the industrial arts and for ornamentation has been the ambition and persistent endeavor of this company. The highest quality best serves the user. We are here to serve you.

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New York Office, 114 Liberty Street

PERSONALS

• **D. W. R. Morgan**, for the past year assistant manager of engineering of the South Philadelphia plant of Westinghouse Electric & Mfg. Co., has been appointed manager of manufacturing of both the South Philadelphia works and the new merchant ship equipment shops. **A. P. Craig**, who has been engaged in supervising plans and construction of Navy Ordnance plants being built by Westinghouse in Canton and Louisville, will be responsible for coordinating the work of all company departments in building and equipping the merchant ship factory buildings. **George P. Passmore** has been appointed to take charge of the industrial relations department at South Philadelphia.

Mr. Morgan joined the Westinghouse company as a student engineer in 1913 after his graduation from Ohio Northern University. The following year he was transferred to the drafting department and later to the engineering department. In 1917 he became manager of condenser engineering and was later moved to the South Philadelphia works to take charge of the plant's oil engine design. He returned to the condenser division in 1931.

Mr. Craig joined Westinghouse in 1928 as a graduate student engineer, following his graduation from Cornell University the

previous year. He was transferred to the New York sales office of the company's industrial division and during the New York World's Fair was director of the Westinghouse exhibit. He has since been executive assistant in the emergency products division.

• **Edward I. Evans**, district manager of Republic Steel Corp.'s Gulfsteel district, has been put in charge of the newly-created Southern district, including operations in both Gadsden and Birmingham. Mr. Evans, whose headquarters will be in Gadsden, has been in the steel business for 42 years.

At the same time, **B. W. Norton**, assistant manager in Republic's Warren district, will become general superintendent of blast furnaces and mines in the Southern district with headquarters in Birmingham. Mr. Norton has been with Republic since 1925.

A. G. Delaney, assistant district manager for Republic at Gadsden, will become general superintendent. Mr. Delaney spent eight years each with the Dwight P. Robinson Co. and Gulf States Steel, in the capacity of construction engineer and superintendent of maintenance, continuing at that position following the merger of the latter company with Republic Steel in 1937, and was named assistant district manager in 1939.

• **J. L. Holloway**, who joined the Crane Co., Chicago, in 1935, has been elected vice-president in

charge of finance. He was secretary of the company from 1937 until his appointment as assistant to the president in 1940.

• **Harold G. Smith**, former chief engineer of the automotive division of the Buda Co., Harvey, Ill., has been promoted to executive engineer of the company, in charge of all engineering of automotive, marine and industrial engine and radial diesel engine division.

• **Herbert N. Snowden**, heretofore assistant general superintendent of the wire mills of the John A. Roebling's Sons Co., Trenton, N. J., has been appointed general works manager of the Seneca Wire & Mfg. Co., Fostoria, Ohio. He was identified with the Roebling company for 20 years, for 10 of which as superintendent of the wire mills in Roebling, N. J.

• **A. C. Berg** has been placed in charge of manufacturing for the road machinery division of Gar Wood Industries, Inc., Detroit. He has been employed by Gar Wood since 1919 and will be engaged now principally in supervision of production of road building machinery required in the national defense program.

• **C. T. Hapgood** has been appointed assistant district sales manager in Houston for Jones & Laughlin Steel Corp., Pittsburgh. He formerly held the same posi-



D. W. R. MORGAN, manager of manufacturing of South Philadelphia works of Westinghouse Electric & Mfg. Co.



A. P. CRAIG, in charge of coordinating activities at new merchant ship factory buildings at South Philadelphia works of Westinghouse.



C. T. HAPGOOD, assistant district sales manager in Houston for Jones & Laughlin Steel Corp.

tion at Los Angeles. **W. R. K. Scott** has been transferred from the company's Houston office to the Los Angeles office.

• **J. P. Debri** has been appointed superintendent of the Rockdale works at Joliet, Ill., of American Steel & Wire Co., succeeding **Daniel Lynch**, who is retiring after 46 years with the company. At Duluth, **F. J. Martin** has been made general superintendent and **J. C. Witherspoon** assistant general superintendent. Mr. Martin previously was superintendent of the hot mills and finishing mills, while Mr. Witherspoon was superintendent of the steel works. **Alfred Osolin**, master mechanic at the Cuyahoga works, Cleveland, has been appointed general master mechanic in the company's main office, while **Robert E. Cramer**, at present with the Donora, Pa., works, has been appointed superintendent of engineering and maintenance at Donora Steel works, succeeding Mr. Cramer, while **Axel H. Olsen** has been appointed master mechanic at Cuyahoga works to succeed Mr. Osolin. At the same time, **Carl Rohrer** has been appointed general foreman of maintenance and construction at Cuyahoga works.

• **Truman G. Glenn** has been appointed engineer in the Detroit office of General Electric Co., succeeding **Thomas E. Nicoll**, who will retire Oct. 1 after more than 38 years with the company but will continue in active service in an advisory capacity until his retirement. A native of Wisconsin, Mr. Glenn was graduated from the University of Wisconsin in 1922. Until recently he has been assistant district engineer at Chicago for G. E.

• **Harry G. Anderson** of the Cleveland office of M. A. Hanna Co., has been appointed chief clerk and purchasing agent of the Clifton Ore Co., Inc., subsidiary, De-Grasse, N. Y. Mr. Anderson also is serving as assistant to **Guy B. Hunner**, superintendent of the new ore mine.

• **Kent R. VanHorn**, research metallurgist, Aluminum Co. of America, Cleveland, and **Norman F. Tisdale**, metallurgist, Molybdenum Corp. of America, have been nominated as new trustees of the American Society for Metals.

OBITUARY...

• **Walter D. Sayle**, president of four Ohio manufacturing concerns and for many years a leader in industrial circles in Cleveland, died in that city Sept. 5, aged 81 years. He was president of Cleveland Punch & Shear Works Co., the City Foundry Co., Cleveland, Cleveland Crane & Engineering Co., Wickliffe, and the Ohio Machine Tool Co., Kenton, Ohio.

Mr. Sayle was born in Cleveland and was one of the founders of the East End Savings Bank Co., of which he was director and secretary until it was merged with the Cleveland Trust Co. in 1905. While engaged in the banking business Mr. Sayle became interested in manufacturing. In 1890 he organized the Cleveland Punch & Shear Works Co., and in 1897 founded the Cleveland Crane & Engineering Co. In 1903 he purchased the City Foundry Co., which under his direction has become a leader in its field here. In 1911 he expanded by purchasing controlling interest in the Ohio Machine Tool Co., at Kenton.

Mr. Sayle has been a member of the National Metal Trades Association since 1901, serving on its administrative council for several terms and as its president in 1906.

• **Alvan T. Simonds**, president of the Simonds Saw & Steel Co., Fitchburg, Mass., died on Sept. 2, at his home in Jamaica Plain, Boston. Recently he resumed the presidency of the company which he had relinquished to a brother, Gifford, who later died. Mr. Simonds was born in Fitchburg, Dec. 23, 1876.

A Harvard University graduate in 1899, a student of the School of Metallurgy, Sheffield, England, a captain in the Ordnance Department during the first World War, president of the Fitchburg company first in 1913, lecturer and writer on economics, Mr. Simonds is probably better remembered as a chief backer of the Harvard Graduate School of Business Administration in an endeavor to encourage business men to be more scientific in their vocation.

• **Herman F. Klingele**, associated with various Worcester, Mass., industries until his retirement in

1935, died in that city Sept. 3, aged 78 years. His most noted achievement was the design and patent of an automatic crank pin grinder.

• **Albert E. Newton**, vice-president and general manager of the Collins Co., West Hartford, Conn., died suddenly at the plant Sept. 3. He was 63 years old. Formerly he was general manager of the Reed-Prentice Co., Worcester.

• **John P. Ashey**, founder of the Rockwood Sprinkler Co. with George I. Rockwood at Worcester, Mass., in 1906 and associated with the company until his retirement several years ago, died, Sept. 3, at St. Petersburg, Fla., where he made his home.

• **Alexander B. Charleton**, manager, Alameda, Cal., works of Bethlehem Fabricated Steel Construction Division, died suddenly Sept. 4, at Seattle. He was 56 years old. Giving up his practice as a consulting structural engineer in San Francisco, Mr. Charleton became manager of Central Iron Works, Alameda, in 1917. When Central was purchased by McClintock-Marshall in 1928, Mr. Charleton remained in the same capacity. Bethlehem purchased McClintock-Marshall in 1932, when Mr. Charleton became works manager.

• **Clarence H. Kennedy**, since 1929 vice-president in charge of sales of the Kennedy Valve Mfg. Co., Elmira, N. Y., died after a long illness at St. Joseph Hospital in that city on July 21, aged 50 years. After his graduation from Cornell University in 1912 he joined the company which had been founded by his father in 1877.

• **George Richard Herbst**, 46 years old, a sales representative for a number of tool and die firms in Detroit, died, recently.

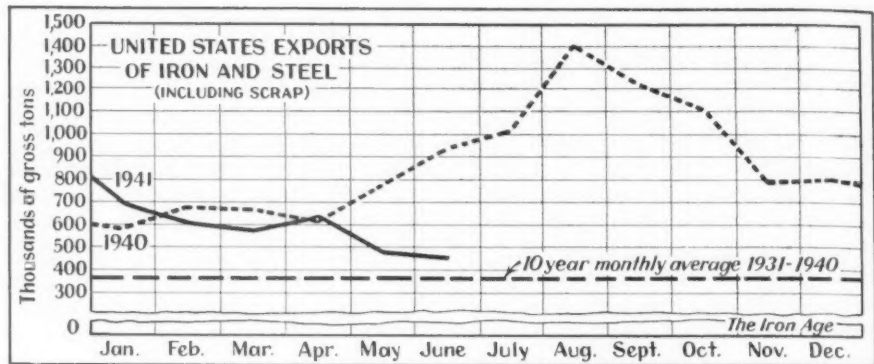
• **Frederick J. Westrope**, active in the automobile body engineering field for more than 25 years, died recently at the age of 49. Mr. Westrope was development engineer for F. L. Jacobs Co., Detroit. He had been a resident of Detroit for 35 years.

• **Vernon W. Young**, for 15 years a vice-president of the Eureka Vacuum Cleaner Co., Detroit, died recently.

June Steel Exports

Total 457,685 Tons

Exports of iron and steel products in June amounted to 457,685 gross tons, lowest in 14 months, according to the Department of Commerce. May exports were 409,840 tons. Exports in the first six months of the current year totaled 3,423,548 tons (see table below) against 4,243,749 tons in the comparable period of 1940. This decrease was due largely to the drop in steel scrap shipments. For other details of imports and exports see THE IRON AGE, Sept. 4, 1941, p. 88.



IMPORTS

(Gross Tons)

June		Six Months Ended June	
1941	1940	1941	1940
1,245	3,606	2,937	16,445
624	126	1,905	664
...	...	...	190
...	...	...	609
6,473	1	16,893	1,260
8,342	4,376	21,758	24,943
2	31	57	440
...
14	78	105	3,926
16	109	162	4,366
26	9	44	89
...
1	1	8	7
...
42	81	164	1,726
...	...	...	194
...
...	32	153	817
...	...	...	601
9	...	49	687
63	16	150	16
15	6	60	57
...
28	135	572	2,008
1	18	28	786
10	56	88	426
...	...	...	44
246	101	1,517	1,357
9	8	21	103
6	3	22	124
1,348	531	2,623	885
5	...	6	12
...	...	...	3
1,809	997	5,520	9,942
...	...	...	419
...	...	...	2
23	23	151	376
...
23	23	161	797
10,190	5,505	27,601	40,048

EXPORTS

(Gross Tons)

June		Six Months Ended June	
1941	1940	1941	1940
35,402	30,915	304,224	129,336
521	777	2,328	10,097
...
1,479	3,087	13,161	5,857
...
59,018	317,683	415,880	1,478,806
96,420	352,462	735,593	1,624,096
58,595	206,403	631,720	620,120
31,130	9,525	229,940	18,208
16,128	11,290	83,055	31,421
6,575	28,036	62,177	102,416
112,428	255,254	1,006,892	772,165
29,775	51,091	202,997	243,177
6,531	14,302	55,057	88,360
961	509	6,435	3,568
74	154	543	982
22,006	50,865	217,788	226,631
764	125	3,134	1,349
12	107	163	236
31,427	42,009	257,434	281,130
125	1,362	1,830	8,362
9,209	3,006	39,600	14,627
29	33	312	550
...
9,008	14,345	73,270	87,728
234	93	793	500
40	50	260	364
122	3,105	3,711	6,870
15,259	26,777	141,646	106,695
843	9,182	29,477	39,630
24,551	34,074	114,012	267,677
1,296	2,546	11,873	14,194
12,450	11,203	73,826	53,661
16,161	11,578	67,795	100,755
4,511	1,647	27,401	11,474
6,015	7,655	33,952	43,167
1,284	721	8,568	5,630
8,111	4,194	34,821	19,337
10,802	12,694	61,733	64,009
715	736	5,434	3,384
3,402	1,675	20,526	7,916
14,146	6,036	96,639	68,901
...
1,801	1,513	17,087	10,342
231,661	313,387	1,608,117	1,781,206
5,392	7,609	32,848	36,133
363	306	2,533	2,338
6,166	3,587	31,253	15,995
945	633	3,955	3,203
4,307	1,626	11,357	8,613
17,173	13,761	81,946	46,282
457,685	934,864	3,432,548	4,243,749

¹ In imports the tonnage shown is the alloy content; the manganese, chromium and silicon content, as the case may be. ² Imports include skelp and saw plate. ³ Import figure included iron slabs. ⁴ Imports include sashes and frames only.

* No separate figures.

Colombia Chief Source of U. S. Iron Ore Imports in June

Washington

... Colombia was the chief source of iron ore imports into the United States in June, shipping 164,400 tons out of imports total of 224,928 tons, according to the Department of Commerce. Canada

was second largest source with 34,611 tons. Data on June imports of iron ore and manganese ore follow:

(Gross Tons)	
Iron ore	224,928
United Kingdom	23
Canada	34,611
Mexico	954
Newfoundland and Labrador	2,640
Cuba	11,400
Brazil	10,900
Colombia	164,400
Manganese ore (35% and over)	50,311

(Gross Tons)	
Battery Grade	2,893
Netherlands Indies	1,169
Gold Coast	1,725
Other	47,418
Russia	2,828
Mexico	61
Cuba	13,951
Bolivia	35
Brazil	3,847
Chile	1,470
British Indies	9,210
Philippine Islands	978
Union of South Africa	4,134
Gold Coast	10,890
Morocco	14

August Pig Iron Output at 97.5% Sets New Record

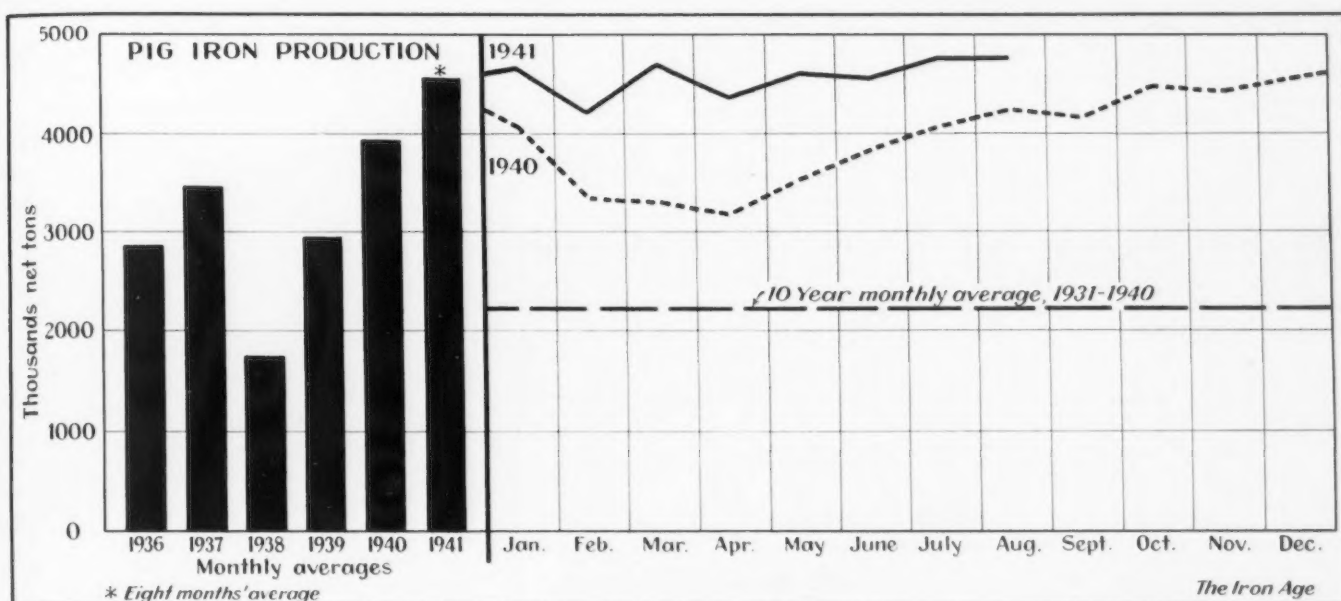
••• Coke pig iron production in August reached a new high, totaling 4,791,432 net tons compared with 4,770,778 tons in July.

The operating rate for the industry was 97.5 per cent of capacity in August compared with 97.1 per cent in July.

There were 213 furnaces in blast on Sept. 1 which were producing

at the rate of 155,020 tons a day, compared with 211 in blast on Aug. 1 with a production rate of 153,896 tons. United States Steel Corp. blew in three furnaces and took one off blast; independent producers took off one furnace and one merchant furnace was blown in.

The furnaces blown in include: one Duquesne and one South Chicago, Carnegie-Illinois Steel Corp.; one Ensley, Tennessee Coal, Iron & Railroad Co.; and one furnace of the Woodward Iron Co. The two furnaces blown out were one Sparrows Point, Bethlehem Steel Co., and one Ohio, Carnegie-Illinois.



Production of Coke Pig Iron and Ferromanganese

	Pig Iron*		Ferro-Mn†	
	1941	1940	1941	1940
January	4,663,695	4,032,022	35,337	43,240
February	4,197,872	3,311,480	33,627	38,720
March	4,704,135	3,270,499	55,460	46,260
April	4,334,267	3,137,019	56,871	43,384
May	4,599,966	3,513,682	52,578	44,972
June	4,553,165	3,818,897	53,854	44,631
½ year	27,053,100	21,083,600	293,727	261,208
July	4,770,778	4,053,945	57,710	43,341
August	4,791,432	4,238,041	52,735	37,003
September		4,176,527		33,024
October		4,445,961		32,270
November		4,403,230		31,155
December		4,547,602		35,666
Year		46,948,906		473,667

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	Per Cent Capacity		Per Cent Capacity	
	1941	1940	1941	1940
January	150,441	95.5	130,061	85.8
February	149,924	95.2	114,189	75.1
March	151,745	96.9	105,500	68.9
April	144,475	91.8	104,567	68.6
May	148,386	92.8	113,345	74.8
June	151,772	95.9	127,297	83.9
½ year	149,465	94.5	115,844	76.1
July	153,896	97.1*	130,772	86.3
August	154,562	97.5	136,711	90.4
September			139,218	92.2
October			143,418	94.8
November			146,774	97.1
December			146,697	97.2
Year			128,276	84.6

*Revised for capacity as of June 30, 1941.

Merchant Iron Made, Daily Rate

	1941	1940	1939
January	20,812	16,475	11,875
February	21,254	14,773	10,793
March	23,069	11,760	10,025
April	20,434	13,656	9,529
May	21,235	16,521	7,883
June	21,933	13,662	8,527
July	21,957	16,619	9,404
August	22,578	17,395	11,225
September		17,571	12,648
October		18,694	16,409
November		22,792	16,642
December		19,779	16,912

Production by Districts and Coke Furnaces in Blast (In Net Tons)

	August, 1941	Daily % of Capacity	July, 1941	Daily % of Capacity*	August, 1940	Sept. 1, 1941		Aug. 1, 1941	
						No. in Blast	Operating Rate	No. in Blast	Operating Rate
Eastern	34,411	97.6	29,648	84.7	37,227	2	1,100	2	955
Buffalo	302,796	97.4	294,165	94.6	279,994	14	9,770	14	9,490
Philadelphia	402,871	92.0	411,851	94.1	385,258	17	12,460	18	13,350
Ferro. and Spiegel	17,091	97.0	16,255	91.8	7,307	4	550	4	525
Pittsburgh	1,144,425	95.7	1,157,916	96.8	1,022,570	47	37,375	45	36,980
Ferro. and Spiegel	44,490	102.6	39,297	90.8	25,805	5	1,435	6	1,270
South Ohio River	96,224	88.5	97,760	89.9	86,210	7	3,105	7	3,155
Valleys	587,416	100.4	600,709	102.7	535,576	24	18,770	25	19,380
Wheeling	213,394	104.0	214,138	104.3	156,502	9	6,885	9	6,910
Cleveland	418,654	102.7	415,293	101.2	366,759	17	13,505	17	13,395
Chicago	1,042,110	99.4†	1,030,498	97.0	886,199	39	33,615	39	33,240
Ferro. and Spiegel	13,705					1	440	0	
St. Louis						0		0	
Detroit	102,187	88.0	102,543	88.4	98,958	4	3,295	4	3,310
Western	71,565	113.9	68,627	109.2	45,263	4	2,310	4	2,215
Ferromanganese					4,407	0		0	
Southern	297,871	95.1	289,920	92.5	296,237	18	10,335	16	8,945
Ferromanganese	2,222	24.2	2,158	23.4	3,769	1	70	1	70
Total	4,791,432	97.5	4,770,778	97.1	4,238,041	213	155,020	211	153,190

*Revised for capacity as of June 30, 1941.
†Spiegel rate included.

CONSTRUCTION STEEL

. . . STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings slightly lower at 19,850 tons; new projects decline to 20,100 tons from 25,750 tons last week; plate awards only 265 tons.

AWARDS

NORTH ATLANTIC STATES

2500 Tons, various locations, eight cranes for Navy Department, to Bethlehem Steel

Co., Bethlehem, Pa., through R. W. Kaltenbach, contractor.

700 Tons, Queens, New York, grade separation bridges, 30-32nd Avenues, to American Bridge Co., Pittsburgh.

650 Tons, Rome, N. Y., engine test and repair building, to Harris Structural Steel Co., Plainfield, N. J.

550 Tons, Niagara Falls, N. Y., building for Vanadium Co. of America, to Bethlehem Steel Co., Lackawanna, N. Y.

365 Tons, Newark, N. J., St. Michael's Mater-

nity Hospital, to Weatherly Steel Co., Weatherly, N. Y.

350 Tons, Chenango County, N. Y., State highway bridge FAGH-RC-41-40, to American Bridge Co., Pittsburgh.

325 Tons, Kendaia, N. Y., munitions depot for Seneca Ordnance, to Seneca Engineering Corp., Montour Falls, N. Y.

120 Tons, Buffalo, garage for National Analine & Chemical Co., to R. S. McManus Steel Construction Co., Inc., Buffalo.

SOUTH AND SOUTHWEST

11,600 Tons, Marion, Okla., Midwest air depot for War Department, to J. B. Klein Foundry & Iron Co., Oklahoma City, in cooperation with Capitol Iron & Steel Co., Oklahoma City; Patterson Steel Co. and Tulsa Boiler Works, Tulsa, and Muskegee Iron Co., Muskogee.

740 Tons, Texas City, Tex., furnace steel, to Ingalla Iron Works Co., Birmingham.

300 Tons, New Orleans, 15 transmission towers, to Lehigh Structural Steel Co., Allentown, Pa.

CENTRAL STATES

415 Tons, Lawrenceburg, Ind., flood wall, to Laclede Steel Co., St. Louis.

WESTERN STATES

1200 Tons, Burbank, Cal., Lockheed Aircraft Corp., assembly building, to Consolidated Steel Corp., Los Angeles.

730 Tons, Santa Monica, Cal., Douglas Aircraft Corp., freight warehouse and storage, to Bethlehem Steel Co., Los Angeles.

PENDING STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

400 Tons, Philadelphia, optical shop at Frankford Arsenal; Lehigh Structural Co., Allentown, Pa., low bidder.

280 Tons, Wayne County, Pa., highway bridge; bids Sept. 12.

230 Tons, Linden, N. J., plant addition for Lawrence Corp.

210 Tons, New York, additions and alterations to Lincoln Hospital.

200 Tons, Steuben County, N. Y., State highway bridge, no bids received Aug. 27; will be rebid.

165 Tons, Brooklyn Navy Yard, crane bridges.

150 Tons, West Lampeter Township, Pa., State highway bridge LR-136, section 1, TR-222.

140 Tons, Lancaster County, Pa., highway bridge; bids Sept. 12.

130 Tons, Rockaway Park, N. Y., pumping station.

100 Tons, Carbon County, Pa., highway bridge; bids Sept. 19.

100 Tons, Jefferson County, N. Y., highway bridge, Bero Engineering Corp., Buffalo, low bidder on general contract.

THE SOUTH

325 Tons, Lenoir City, Tenn., spillway operating bridge, Fort Loudoun, for TVA.

170 Tons, Fort Sumner, N. M., State railroad underpass.

CENTRAL STATES

3500 Tons, Milwaukee, supercharger plant for Defense Plant Corp.

2000 Tons, Cincinnati, bridges for Louisville & Nashville Railroad Co.

300 Tons, Duluth, Minn., coke and ore bins for Interlake Iron Corp.

250 Tons, Roberston, Mo., addition to McDonnell Aircraft Corp. plant.

WESTERN STATES

12,000 Tons, Renton, Wash., factory buildings for Boeing Airplane Co.

FABRICATED PLATES

AWARDS

165 Tons, Texas City, Tex., tin storage bins, to Mosher Steel Co., Dallas, Tex.

100 Tons, Presque Isle, Me., government standpipe, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Wyandotte MK 50 Solvent Detergent

cleaning before
FOR paints, lacquers
and enamels

It is used only in Power Washers and

It is successfully taking care of many problems such as

Cleaning steel stampings prior to painting

Cleaning tubular steel stirring columns prior to lacquering

Cleaning steel shells prior to painting

Cleaning brass stampings prior to lacquering

It is economical to use. One gallon Wyandotte MK 50 to 1000 gallons water handles most problems

It can be adapted to use in any spray washing equipment

• Why not call in your Wyandotte Representative and have him check over your cleaning operations? The chances are he can save you time and money. He may show you a short cut or a new cleaner.



THE J. B. FORD SALES CO. • WYANDOTTE, MICHIGAN

Reinforcing Steel

Awards of 53,345 tons; 2315 tons in new projects.

AWARDS

ATLANTIC STATES

- 800 Tons, Pittsburgh, Glen Hazel Heights defense housing, to an unnamed bidder; Starrett Co., contractor.
- 800 Tons, Washington, test boring engineering reproduction plant, to Bethlehem Steel Co., Bethlehem, Pa., through C. H. Tompkins Co., contractor.
- 300 Tons, Bellevue, D. C., Naval research laboratory extension, to Pollak Steel Co., Cincinnati.
- 250 Tons, Wyman Crossing, Me., Maine Central underpass, to Bancroft & Martin Rolling Mill Corp., Portland, Me.
- 200 Tons, Washington, Edwin C. Shelton apartment building, to an unnamed bidder; L. E. Breuninger, contractor.
- 200 Tons, mesh, Lincoln, R. I. Louisquiset Pike bridge, to American Steel & Wire Co., Worcester, Mass.
- 189 Tons, Hartford, Conn., State highway bridge, to Truscon Steel Corp., Youngstown, through Mariana Construction Co.
- 160 Tons, Annville, Pa., silos, to Bethlehem Steel Co., Bethlehem, Pa.; E. C. Machine Co., contractor.
- 120 Tons, Pittsburgh, Liberty bridge improvements, to Electric Welding Co., through Harrison Contractors.
- 100 Tons, South Boston, Navy Yard garage and fire station, to Joseph T. Ryerson & Son, Inc., Cambridge, Mass.

THE SOUTH

- 3500 Tons, Memphis, Tenn., quartermaster depot, to Jones & Laughlin Steel Corp., Pittsburgh, through Wilson, Walters & Prater, Memphis.
- 1600 Tons, Flora, Miss., Mississippi ordnance plant, to Laclede Steel Co., St. Louis.
- 1350 Tons, Corpus Christi, Tex., Naval air station, to Colorado Fuel & Iron Co., Denver.
- 500 Tons, Fayette County, Ky., Avon Signal Corps depot facilities, to Truscon Steel Co., Youngstown, through F. Messer & Sons.
- 355 Tons, Charleston, S. C., quartermaster inquiry No. 1385, to Republic Steel Corp., Cleveland.

CENTRAL STATES

- 2500 Tons, Lacarne, Ohio, War Department warehouse, to Pollak Steel Co., Cincinnati; Skilken Brothers, contractors.
- 630 Tons, Louisiana, Mo., ordnance plant, Schedule No. 1334, to Republic Steel Corp., Cleveland.
- 530 Tons, Moraine City, Ohio, Frigidaire Division, General Motors Corp., to Pollak Steel Co., Cincinnati.
- 480 Tons, Detroit, Davison Avenue bridge, to Great Lakes Steel Corp., Detroit.
- 300 Tons, Plymouth, Mich., Burroughs Adding Machine Co. expansion, to Truscon Steel Co., Youngstown, through Esslinger-Misch Co.
- 200 Tons, Mankato, Minn., plant for Continental Can Co., to Truscon Steel Co., Youngstown, through Austin Co., Cleveland.
- 180 Tons, Cincinnati, addition, Cincinnati Milling Machine Co., to Pollak Steel Co., Cincinnati; Austin Co., contractor.
- 100 Tons, Lockland, Ohio, Wright Aeronautical Corp. carburetor test laboratory, to Pollak Steel Co., Cincinnati; F. Messer & Son, contractors.
- 100 Tons, Dayton, Ohio, runways, Wright Field, to West Virginia Rail Co., Huntington, W. Va.; Hinton & Smalley, contractors.

WESTERN STATES

- 36,000 Tons, Pacific Ocean islands, Navy defense construction, allocated as follows: 14,000 tons to Columbia Steel Co., San Francisco; 12,000 tons to Bethlehem Steel Co., San Francisco; 7500 tons to Judson Steel Corp., Oakland, Cal.; and 2500 tons to Pacific States Steel Corp., San Francisco, through Pacific Naval Constructors, Alameda, Cal., contractors.

CANAL ZONE

- 1900 Tons, Panama Canal, Schedule No. 5344, to Republic Steel Corp., Cleveland.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 650 Tons, Wireton, Pa., power station addition, Duquesne Light Co.

Weekly Bookings of Construction Steel

Week Ended	Sept. 9, 1941	Sept. 2, 1941	Aug. 12, 1941	Sept. 10, 1940	Year to Date 1941	Year to Date 1940
Fabricated structural steel awards	19,850	20,900	32,880	35,500	985,195	678,335
Fabricated plate awards	265	575	0	1,065	96,910	111,315
Steel sheet piling awards	0	0	0	2,285	20,760	33,400
Reinforcing bar awards	53,345	26,900	8,440	16,850	518,540	335,615
Total letting of Construction Steel	73,460	48,375	41,320	55,700	1,621,405	1,158,665

- 300 Tons, South Boston, Mass., U. S. Engineer's depot proposal.
- 250 Tons, Washington, Scott's Hotel, girls' dormitory.
- 250 Tons, Sandy Hook, Md., bridge over Potomac River.

SOUTH AND CENTRAL

- 500 Tons, Richmond, Va., Gilpin Court housing; Laburnum Construction Co., contractor.
- 250 Tons, Cincinnati, highway project No. 196; bids taken.
- 115 Tons, Bay City, Mich., Chevrolet Division, General Motors Corp.



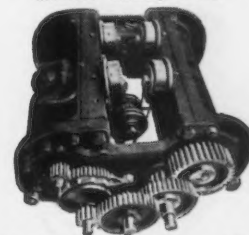
I NEED

Balance



You Need BALANCE in a HOIST

LO-HED, the Balanced Hoist. You can instantly single out a Lo-Hed hoist because of its characteristically different appearance. Ordinarily, appearance isn't important in a hoist but it just so happens that a Lo-Hed hoist gets its appearance from a basically different construction. Motor and drum are arranged on opposite sides of the beam. The hook is directly in the center and can be pulled up close to the beam—an extra advantage where headroom is low. Because motor and drum shafts are separate and parallel the motor can be geared to the drum through efficient spur gears. Buy the hoist that's balanced if you want low operating and maintenance costs. Write for Lo-Hed catalog today.



LOOK AT THE BALANCED LO-HED!

It Costs Less To Operate—All gears are efficient stub-tooth, spur gears running in a sealed oil bath . . . gear shafts and trolley wheels are equipped with heavy-duty ball or roller bearings.

It Costs Less To Maintain—Sturdy construction . . . seldom, if ever, requires removal from rail . . . covers of controller, motor, drum and gearing are easily removed.

It's Safe—Factor of safety of over 5 at full capacity . . . 100% Positive Automatic Stop when load reaches upper limit . . . Automatic Holding Brake prevents load from drifting when current is shut off . . . short, strong shafts minimize torsional stresses.

It's Protected—Controller is fire, dust and moisture proof . . . motor totally enclosed . . . gearing sealed in . . . motor and drum covered by easily removable covers.

AMERICAN ENGINEERING COMPANY

The Lo-Hed Hoist Is Applicable To Any Monorail System. There's A Balanced Lo-Hed Electric Hoist For Every Purpose.

OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

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- ☐ Please send me your complete catalog of LO-HED HOISTS.
- ☐ Ask your representative to get in touch with me promptly.

Name

Company

Street Address

City..... State.....

(Please print plainly)

Cast Iron Pipe

• **Freeport, Tex.**, plans pipe line extensions in water system and other waterworks installation. Cost about \$198,000. Financing is being arranged through Federal aid. H. G. Olmsted, 4301 Galveston Road, Houston, Tex., is consulting engineer.

• **Wapello, Ill.**, plans pipe lines for water system and other waterworks installation. Cost about \$53,600. Special election has been called Sept. 23 to vote bonds for project in amount noted. Warren & Van Prag, Decatur, Ill., are consulting engineers.

• **Vandalia, Ohio**, plans pipe lines for water system and other waterworks installation. Cost about \$460,000. Of this amount over \$300,000 will be used for main supply and distribution lines, and about \$120,000 for new pumping station, elevated steel tank and tower of 125,000 gal. capacity, filter plant and auxiliary work. Financing is being arranged through Federal aid. George Steller, V-B Building, Vandalia, and 213 Monray Street, Dayton, Ohio, is consulting engineer.

• **Water Department, Tulsa, Okla.**, plans about four miles of 36-in. pressure feed line in connection with extensions and improvements in water system; also new pumping machinery with rating of 24,000,000 gal. per day, enlargements in filtration plant, 500-hp., boiler and auxiliary equipment in Mohawk pumping station, extensions in distribution lines, and other waterworks installation. Cost about \$725,000. Financing is being arranged through Federal aid. W. F. McMurray is department engineer.

• **Santa Maria-Lompoc, Cal.**, Army armored division cantonment, for which contract has been awarded to McDonald & Kahn, San Francisco, and J. F. Shea, Los Angeles, involves 2202 ft. of 12-in. pipe, 29,183 ft. of 8-in., 153,484 ft. of 6-in., and fittings.

Pipe Lines

• **Ray Stephens, Inc.**, First National Bank Building, Oklahoma City, will begin work soon on new 16-in. welded steel pipe line from gas field near Cement, Okla., to Oklahoma City, about 55 miles, for natural gas transmission. Two booster stations will be built. Connection will be made with lines of Cities Service Co., at last noted place. Cost close to \$450,000.

• **United States Engineer Office, Mobile, Ala.**, has asked bids (no closing date stated) for pressure pipe line for natural gas transmission to Keesler field, Biloxi, Miss., for service at local aviation mechanics' training school (Circular 141).

• **W. T. Ross, Riverton, Wyo.**, oil operator, plans welded steel pipe line from oil field at Maverick Springs, Wyo., to Shoshoni and Bonneville, Wyo., about 34 miles, for crude booster pumping station and other operating oil transmission. Cost close to \$225,000 with facilities.

• **Bay St. Louis, Miss.**, plans pressure pipe line system for municipal natural gas distribution, with meter house, control station and other operating facilities. Cost about \$80,000. Bond issue in that amount has been authorized.

• **Shell Oil Co.**, Shell Oil Building, Los Angeles, has let contract to Maceo Construction Co., 815 North Paramount Boulevard, Clearwater, Cal., for new 10-in. welded steel pipe line from pumping station in Ventura, Cal., oil field district to oil refinery in Wilmington district, Los Angeles, about 90 miles, for crude oil supply at latter point. Contract for pipe has been divided between Youngstown Sheet & Tube Co., and National Tube Co., as previously announced.

• **Opelousas, La.**, is considering pressure pipe line system for municipal natural gas system.

Talking Motion Pictures Made For Training Workers

• • • **Film Productions Co.**, Minneapolis, announce completion of a series of eight talking motion pictures designed to train apprentices in machine shop practice, supplementing practical shop training. The series of films include eight subjects in 12 reels, covering metal cutting principles, precision layout and measuring, jigs and fixtures, dies and die making, lathe operation, planer and shaper operation, milling machine operation and grinding.

One of the first previews of four educational films on lathe operations and the use of cutting tools, made by Film Productions Co., was recently made by a group of industrialists and educators under the auspices of the Herbert D. Hall Foundation. Results have been tabulated by the foundation and sent to the U. S. Office of Education. A digest of the review may be had on request to the foundation, 1060 Broad Street, Newark, N. J.



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Bakelite Corp. Issues New Edition of Plastics Book

• • • **Advances in the art of molding plastics**, especially with the introduction of automatic compression and injection molding and numerous other refinements, have been so rapid that Bakelite Corp. has just issued a new edition of "Molding Technic for Bakelite and Vinylite Plastics." This technical manual has been prepared in collaboration with the plastics division of Carbide and Carbon Chemicals Corp.

The fourth edition contains 226 pages of factual technical data covering molding practices for both hot-set and cold-set molding plastics. There are 177 photographs and line drawings. Some of the topics covered in the fourteen chapters are Principles of Molding; Proper Mold and Product Design; Molding Plant Layout; Heating Media; Weighing, Measuring and Preforming; Finishing Molded Parts; Accessory Equipment; and Molding Plant Cost Accounting.

The price of the regular edition will be \$3.50. Copies are obtainable directly from Bakelite Corp., Department T, 30 East 42nd Street, New York.

NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

OPA To Cut Scrap Aluminum Price

... OPA is considering the advisability of revising downward the ceiling prices on scrap and secondary aluminum to conform to the 2c. a lb. reduction recently made in primary aluminum prices, effective Sept. 30. It was stated that reductions in the scrap prices will be made only after OPA consults smelters and dealers throughout the trade.

Since the inauguration of the scrap copper and brass price ceiling, supplies of these materials have practically dried up and trade has declined to negligible proportions. OPA will begin investigating this matter to determine ways and means of increasing the flow of this scrap.

Generally, large copper suppliers have been pleased with the set-up of consumer certificates, and believe that OPM did a thorough job. By placing these certificates in the consumers' hands on the first of each month, copper distribution, both from the standpoint of the producer and the OPM, has been greatly facilitated. About 37,000 tons of South American copper will be available for distribution by MRC during September. This supply, with the 85,000 tons produced domestically, brings the total for September distribution to about 122,000 tons. However, consumption has been currently running at the rate of 135,000 tons, and the supply situation will be further harassed by the larger tonnages going to Britain under the lend-lease program.

The Navy, with orders for some 7000 tons of various grades of copper standing since June 25, has been unable to issue shipping instructions to sellers because OPM has withheld approval of allocation certificates. OPM believes that the Army and Navy have been buying strategic materials, including copper, too far in advance of their needs. This is believed the first time OPM has cracked down on another important government department.

Sharp advances in Far Eastern

tin prices last week have placed importers in a tight position, not being permitted to sell domestically above the 52c. a lb. price ceiling on tin. Higher prices with the probability of increases in war risk insurance rates for shipping the tin to this country have caused considerable disruption in the market. Far Eastern price advances are believed due to recent Russian tin purchases.

The tin market as far as early deliveries are concerned is sold out, but still the demands for MRC tin have been very small. In the first ten days after MRC announced that it would take care of urgent tin needs, less than 100 tons of the government tin was sold.

Although zinc production has been stepped up considerably during the past few months, still only defense needs are being completely

covered and the chief concern of producers is allocations. Zinc production in August was 75,524 tons as against 74,641 tons produced in July, while stocks rose to 17,696 tons at the end of August from 13,848 tons at the beginning of the month. August daily average production was 28 tons more than during the preceding month.

Average prices of the major non-ferrous metals during August, based on quotations appearing in THE IRON AGE, are as follows:

Non-Ferrous Prices

(Cents per lb. for early delivery)

	Cents per Lb.
Electro copper, Conn. Valley.....	12.00
Lake copper, East., delivery.....	12.00
Straits tin, spot, New York.....	52.45
Zinc, East St. Louis.....	7.25
Zinc, New York.....	7.65
Lead, St. Louis.....	5.70
Lead, New York.....	5.85

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AMERICAN SPRING

AND MANUFACTURING CORP.

Holly, Michigan

MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

New Names Added to "Urgency Standing" List

Cleveland

••• By now, machine tool producers have been able to clarify their major uncertainties in connection with the Supplementary Order No. 1 to General Preference Order No. E-1 (THE IRON AGE, July 17), with the aid of the Tools & Equipment Group of the Division of Priorities in Washington and the National Machine Tool Builders Association here. Taking into consideration the August 21st revisions of the original "urgency standing list," there are now 212 defense contractors listed who have been assigned A-1-a ratings for machine tools, 313 contractors with A-1-b ratings, and 92 contractors with A-1-c ratings. When it is considered that producers of

machine tools, cranes, cutting tools, gages, micrometers and chucks, all rated A-1-a, have preference over the A-1-a contractors on the urgency standing list, the condition of order books of the machine tool industry may be better appreciated. There is little hope for early deliveries to buyers with an A-10 or lower rating.

Activity in the local market was highlighted by the submission of bids for some 500 machine tools which will be required by Apex Electric to fill a large sub-contract it has received from Ford Instrument Co. The latter company holds contracts for control instruments and gun drives and directors, and, as a result, holds a high urgency standing on the OPM's list. Thus, Apex's sub-contract, which will be in the nature of precision work, will likely bear similar priority standing. Apex has been manufac-

turing washing machines and ironers, so that the new defense order will partly offset the expected disruption of the company's normal activities.

An unusual development was the arrival here of a representative of a leading aircraft and auto parts producer in search of second-hand machines of a type that will not be easily secured. An idea of the current intense usage of old machinery may be gathered from the fact that machine builders have been requested very recently to supply replacement parts for units ranging in age from 20 to 40 years.



Priorities Cause Headaches

Cincinnati

••• Machinery demand in this area has not lessened, and in some instances manufacturers indicate that at times the ordering almost reflects the hysterical proportions of the early "boom days." Of course with priorities and tightness of material adding to the market tension, the situation becomes almost a constant battle to keep things moving. So far, the establishment of a district priority office in Cincinnati has not had any ascertainable effect on the situation. Washington continues to cause many headaches on priorities. As one manufacturer put it, "If we were manufacturing bricks, these constant change of orders from Washington would not affect us, but where there are so many variations in machines, we just can't change the machines being built for one buyer and divert them to another one at the change in priority, because of tooling differences."

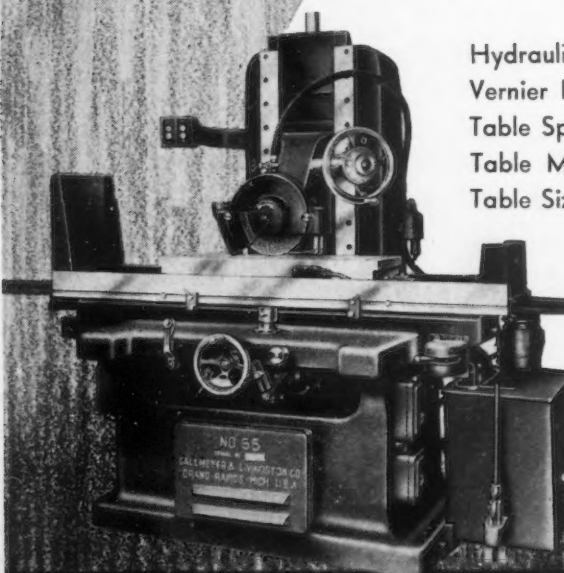
Gisholt Offers Group Insurance

Madison, Wis.

••• Some 2500 employees with more than 1100 dependents will benefit from a plan of group insurance instituted by the Gisholt Machine Co. in a cooperative basis whereby the workers contribute a fixed amount and the company makes up the balance.

GRAND RAPIDS

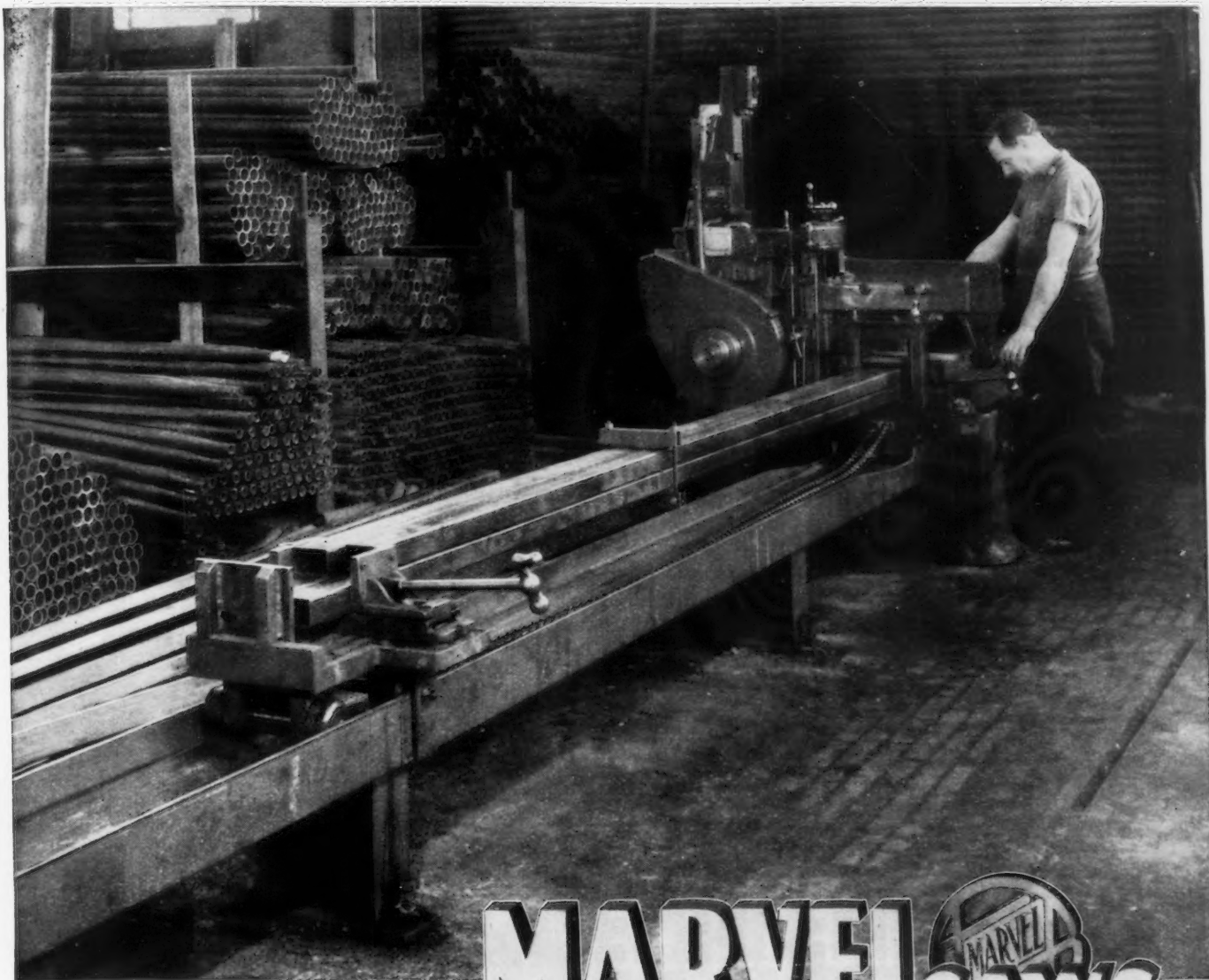
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Hydraulic Feed
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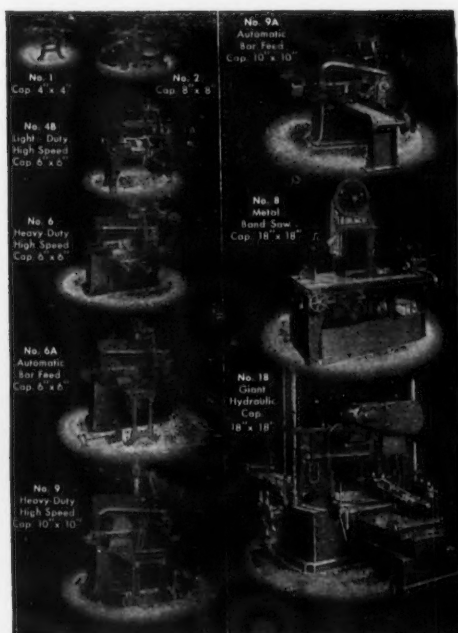
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With one of these versatile heavy-duty all ball-bearing saws, (the fastest cutting-off machines built) the stockroom can provide single pieces, or quantities of identical pieces, cut-off from bars and tubing on a moment's notice. With no more operator attention than is required by an automatic screw machine, these Saws will automatically measure, feed and cut-off identical lengths, slices or pieces from single or nested bars. Quantity runs can be interrupted at any point for a miscellaneous cut by simply disengaging the automatic bar push-up.

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SCRAP

... MARKET ACTIVITIES AND PRICE TRENDS

New Scrap Climax Seen 2 Weeks Away

... A misleading and ominous quiet pervaded most iron and steel scrap markets last week, but with consumption continuing full blast and no adequate solution toward procuring more open market scrap, the situation seemed about two weeks away from another climax.

At Buffalo, steel plant operations were hampered by the lack of scrap. One company shut down and another tapered its production to conserve supplies. In Ohio, one mill buyer reported heavy dependence on production material in the absence of open market supplies.

The expected priority order covering shipments was still in the hands of OPM attorneys, who were

reported preparing a final draft of the order for issuance within a week. Probably much thought was being given to problems of administering such an order, which would be an exceedingly difficult task.

Price ceilings were being observed by some interests but in other directions the schedules were being exceeded on a small scale, particularly in the East on cast scrap, a development which in itself could easily build up into another "situation." Reports of overgrading persist.

Under a new OPA order issued last week, the maximum price fixed for rails sold for re-laying purposes by railroads hereafter will be governed by the price schedule for iron and steel products instead of the schedule for iron and steel scrap. The provi-

sion was deleted from the scrap schedule which allowed a \$5 per ton differential above the rolling rail ceiling, and in its place was included a paragraph defining rail for re-rolling as any rail sold for re-rolling purposes, whether or not such rail is of re-laying quality.

A new threat, aimed at the whole waste materials industry, arose in the announcement that persistent violators of OPA price schedules might lose their municipal business licenses. Further details are given in the Washington dispatch following this summary.

Officers of the Institute of Scrap Iron & Steel met in Washington Monday to discuss simplification of price schedules with defence officials.

Demolition of a three-mile length of elevated railway structure in Brooklyn will start next week, and will yield around 15,000 tons of scrap steel and 220,000 lb. of scrap copper.



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OPA Threatens Violators With Loss of Municipal Licenses

Washington

... Persistent violators of the OPA scrap iron and steel and other price schedules were threatened last week with the revocation of their municipal business licenses under a deal made by Leon Henderson, OPA head, with the United States Conference of Mayors. At the same time OPM made plans to extend its scrap collection campaign to Michigan, Wisconsin and Minnesota and its conservation division called upon the waste materials industry to increase its collections by 20 per cent.

The threatened loss of municipal business licenses was contained in a letter written to Mr. Henderson by F. H. La Guardia, director of the office of civilian defense. Acting in his capacity as president of the United States Conference of Mayors, Mr. La Guardia said he would call attention to "all cases of willful and persistent price ceiling violation which are certified to me by Mr. Henderson," recommending to city heads first that the violators be

cautioned, and later that "the full powers of the municipality be exercised to revoke the licenses of the offenders."

In making the announcement, OPA did not single out the scrap iron and steel price ceiling but mentioned it along with other OPA price schedules covering aluminum, zinc, nickel, brass mill and copper scrap; iron and steel products; pig tin; and second-hand machine tools.

Plans also were made at the meeting for the organization of an OPM industry advisory committee whose job will be to increase the supply of available waste materials. The committee will include three men each from the iron and steel scrap, the non-ferrous metals scrap groups as well as from four other divisions of the waste materials industry.

More Scrap Available for Portsmouth Open Hearths

Portsmouth, Ohio

... Possibility of curtailment in steel operations at the Portsmouth unit of the Wheeling Steel Corp. has now passed, and the company has sufficient scrap to carry the present rate of nine out of ten open hearths in operation for quite a while, company officials reported last week. The establishment, however, of a Cincinnati basing point for scrap might cause a decline in the available material for Portsmouth, according to officials, and they are watching the situation carefully.

Pittsburgh—The trade here continues to await imposition of the scrap priority order and as a consequence transactions have been at a minimum for the past week. There has been no change in opinion here that the growing scrap shortage is becoming progressively worse and that were additional supplies available, steel production would be at a higher level.

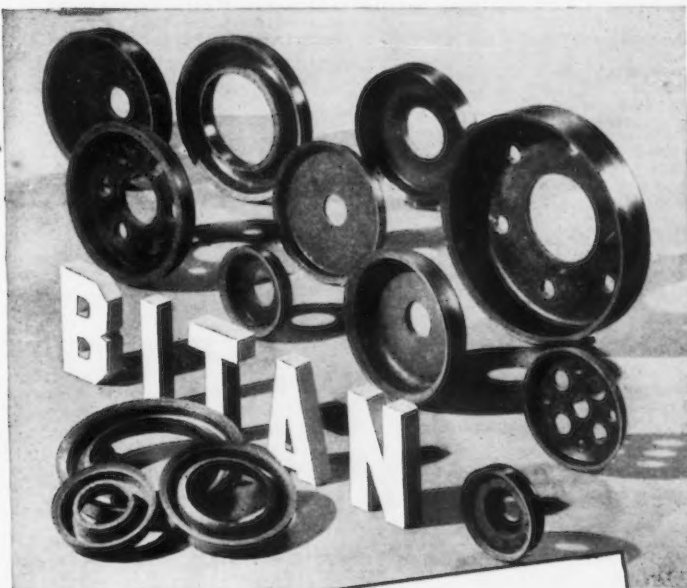
Cleveland—During the past week mills here report that scrap has dried up to some extent. The purchasing agent for one large mill pointed out that most of his scrap had been from production sources and that practically none was available from dealers. If this continued he feared that his plant's steel activity might be curtailed as much as 25 per cent within the next 30 days. Over-grading continues so widespread that certain types of scrap are far removed from the classification in which they are sold. Despite the higher prices thus being obtained by scrap dealers and

the railroads via over-grading, there has been some comment to the effect that prices are too low to expect a sizable flow of scrap.

Buffalo—First signs that the diminishing supply of scrap is becoming acute in this district and that plenty of trouble lies ahead were seen last weekend with the closing down of one major plant and the curtailing of operations by several others. Buffalo Steel Co. ceased operations completely. The plant specializes

in re-rolling of rails and manufacture of reinforcing bars. At the same time, an executive of the Wickwire Spencer Steel Co. reported that plant has used up all its reserve scrap supplies and, unless metal is kept moving to the mill, operations will be curtailed. Local dealers in the scrap industry are cooperating to keep the Wickwire plant supplied, but the outlook was said to be discouraging. Wickwire has been operating three of its four furnaces, but if scrap were available would light its idle unit as it has a substantial order backlog.

(Scrap Prices on Next Page)



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GARLOCK

Iron and Steel Scrap (other than railroad scrap)

(Maximum basing point prices as revised by OPACS to Aug. 26, 1941, from which shipping point prices and consumers' delivered prices are to be computed, per gross ton)

Basing Points ➔	Pittsburgh	Johnstown	Werkton	Steubenville	Youngstown	Warren	Canton	Chicago	Kokomo	Bethlehem	Claymont	Coatesville	Phoenixville	Harrisburg	Shawwos Point	Buffalo	Cleveland	Toledo	Cincinnati*	Portsmouth	Middletown	Ashland	St. Louis	Detroit	Duluth	Min'apolis**	Birmingham	Chattanooga	Radford, Va.	Worcester	Bridgeport	Phillipsdale, R. I.	Los Angeles	San Francisco	Seattle	Portland	Minnequa, Colo.	
▼ GRADES																																						
No. 1 heavy melting	\$20.00	\$20.00		\$20.00		\$18.75	\$18.25	\$18.25	\$18.75	\$18.75	\$19.25	\$19.50			18.75	19.25	19.50		\$19.50	\$17.50	\$17.85	\$18.00	\$17.00										14.50		16.50			
No. 1 hyd. comp. black sheet	20.00	20.00		20.00		18.75	18.25	18.25	18.75	18.75	19.25	19.50			18.75	19.25	19.50		19.50	17.50	17.85	18.00	17.00										14.50		16.50			
No. 2 heavy melting	19.00	19.00		19.00		17.75	17.25	17.25	17.75	17.75	18.25	18.50			17.75	18.25	18.50		18.50	16.50	16.85	17.00	16.00									(See		13.50		15.50		
Dealers' No. 1 bundles	19.00	19.00		19.00		17.75	17.25	17.25	17.75	17.75	18.25	18.50			17.75	18.25	18.50		18.50	16.50	16.85	17.00	16.00								foot-		13.50		15.50			
Dealers' No. 2 bundles	18.00	18.00		18.00		16.75	16.25	16.25	16.75	16.75	17.25	17.50			16.75	17.25	17.50		17.50	15.50	15.85	16.00	15.00								notes)		12.50		14.50			
Mixed borings and turnings	15.25	15.25		15.25		14.00	14.25	13.50	14.00	14.00	14.50	14.75			14.00	14.50	14.75	13.10	14.75	12.75	13.10		12.25										9.75		11.75			
Machine shop turnings	15.50	15.50		15.50		14.25	14.50	13.75	14.25	14.25	14.75	15.00	13.35	15.00	13.00	13.35	15.50	15.00																10.00		12.00		
Shoveling turnings	16.50	16.50		16.50		15.25	15.50	14.75	15.25	15.25	15.75	16.00	14.35	16.00	14.00	14.35	16.50		16.00	14.00	14.35	16.50												11.00		13.00		
No. 1 busheling	19.50	19.50		19.50		18.25	17.75	17.75	18.25	18.25	18.75	19.00			18.25	18.75	19.00		19.00	17.00	17.35	17.50	16.00												14.00		16.00	
No. 2 busheling	15.50	15.50		15.50		14.25	13.75	13.75	14.25	14.25	14.75	15.00			14.25	14.75	15.00		15.00	13.00	13.35	13.50	12.50												10.00		12.00	
Cast iron borings	15.75	15.75		15.75		14.50	14.00	14.00	14.50	14.50	15.00	15.25	13.60	15.25	13.25	13.60	13.75	12.75		15.00	13.00	13.35	13.75	12.75											10.25		12.25	
Uncut structural, plate scrap	19.00	19.00		19.00		17.75	17.25	17.25	17.75	17.75	18.25	18.50			17.75	18.25	18.50		18.50	18.50	16.85	17.00	16.00												13.50		15.50	
No. 1 cupola	21.00	21.00		21.00		20.00	20.00	22.50	23.00	22.00	20.00	22.00			21.00	20.00	22.00		21.00	20.00	20.35	*19.00	20.00	20.50	21.00	20.50	21.00	20.50	21.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Heavy breakable cast	19.50	19.50		19.50		18.50	18.50	21.00	21.50	21.00	18.50	23.50			21.00	18.50	23.50		19.50	18.50	18.85	*17.50	18.50											20.50		17.00		
Stove plate	19.00	19.00		19.00		17.00	16.00	18.00	18.50	18.00	19.00	18.00			18.00	19.00	18.00	15.60	17.50	17.00	14.10	*16.00	17.00	17.50	18.00										14.00			
Low phos. billet, bloom crops	25.00	25.00		25.00		23.75	23.75	23.25	23.75	23.75	24.25	24.50			23.75	24.25	24.50		23.50	22.50	22.85	23.00	22.00													19.50		
Low phos. bar crops, smaller	23.00	23.00		23.00		21.75	21.75	21.25	21.75	21.75	22.25	22.50			21.75	22.25	22.50		21.50	20.50	20.85	21.00	20.00													19.50		
Low phos. pu'ch'gs., plate scrap ¹	24.75	23.00		24.75		21.75	21.75	21.25	21.75	21.75	22.25	22.50			21.75	22.25	22.50		21.50	20.50	20.85	21.00	20.00													17.50		
Machinery east, cupola size ²	22.00	22.00		22.00		21.00	21.00	23.50	24.00	23.50	21.00	23.60			23.50	21.00	23.60		22.00	21.00	21.35	*20.00	21.00	21.50	22.00	22.50	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	
No. 1 mach. cast, drop-broken, 150 lb. and under	22.50	22.50		22.50		21.50	21.50	24.00	24.50	24.00	21.50	23.50			24.00	21.50	23.50		22.50	21.50	21.85	20.50	21.50	22.00	22.50	22.00	22.50	22.00	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	
Clean auto cast	22.50	22.50		22.50		21.50	21.50	24.00	24.50	24.00	21.50	23.50			24.00	21.50	23.50		22.50	21.50	21.85	20.50	21.50	22.00	22.50	22.00	22.50	22.00	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50		
Punchings and plate scrap ³	23.75	22.00		23.75		20.75	20.75	20.25	20.75	20.75	21.25	21.50			20.75	21.25	21.50		20.50	19.50	19.85	20.00	19.00													16.50		
Punchings and plate scrap ⁴	22.75	21.00		22.75		19.75	19.75	19.25	19.75	19.75	20.25	20.50			19.75	20.25	20.50		19.50	18.50	18.85	19.00	18.00													15.50		
Heavy axle, force turnings	21.25	19.50		21.25		18.25	18.25	17.75	18.25	18.25	18.75	19.00			18.25	18.75	19.00		18.00	17.00	17.35	17.50	16.50													14.00		
Medium h'vy. el. f'ce. turnings	19.75	18.00		19.75		16.75	16.75	16.25	16.75	16.75	17.25	17.50			16.75	17.25	17.50		16.50	15.50	15.85	16.00	15.00													12.50		

¹ This grade is 3/8-in. and heavier, cut 12 in. and under. ² May include clean agricultural cast. ³ Under 3/8 to 1/4-in., cut 12 in. and under. ⁴ Under 1/4-in. to No. 12 gage, cut 12 in. and under. ⁵ Youngstown, Warren, Sharon and Canton are not basing points on this grade. ⁶ Middletown and Cincinnati price for this grade is \$15. ⁷ Includes Newport, Ky. ⁸ Minneapolis and St. Paul are basing points on following grades only: No. 1 cupola, heavy breakable cast, stove plate, machinery cast cupola size. No. 1 machinery cast drop broken, clean auto cast.

Railroad Scrap

Where the railroad originator of the scrap operates in two or more of the basing points named, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that switching charges of 84c. per gross ton shall be subtracted from the maximum prices of scrap originating from railroads operating in Chicago and sold for consumption outside Chicago.

GRADES	Basing Points ➤														
	Pittsburgh Sharon, Pa. Wheeling Steubenville Youngstown Canton	Chicago	Kokomo	Philadelphia	Wilmington	Sparrows Point	Cleveland	Buffalo	Portsmouth Middletown Ashland	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Los Angeles San Francisco Seattle
No. 1 heavy melting.....	\$21.00	\$19.75	\$19.25	\$19.75	\$19.75	\$19.75	\$20.50	\$20.25	\$20.50	\$18.50	\$17.00	\$18.85	\$19.00	\$18.00	\$15.50
Scrap rails.....	22.00	20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50	19.50	18.00	19.85	20.00	19.00	16.50
Rerolling rails.....	23.50	22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00	21.00	19.50	21.35	21.50	20.50	18.00
Scrap rails 3 ft. and under.....	24.00	22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50	21.50	20.00	21.85	22.00	21.00	18.50
Scrap rails 2 ft. and under.....	24.25	23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75	21.75	20.25	22.10	22.25	21.25	18.75
Scrap rails 18 in. and under.....	24.50	23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00	22.00	20.50	22.35	22.50	21.50	19.00

Railroads not operating in a basing point may sell rerolling rails f.o.b. their lines at average price of their sales from Sept. 1, 1940, to Jan. 31, 1941. Rerolling mills may absorb all transportation charges necessary to obtain such rails.

Explanatory Notes

(A basing point includes its switching district.)

MAXIMUM PRICE at which any grade of scrap may be delivered to consumer's plant wherever located, is the shipping point price, plus actual transportation to the shipping point to consumer. Where shipment is by water, actual handling charges at the dock are not more than 75¢ a gross ton may be included as part of transportation. However, in no case may this maximum price exceed by more than \$1 prices (for material other than railroad scrap) for the basing point nearest the consumer.

COMPUTING SHIPPING POINT PRICE: A shipping point is the point from which the scrap is to be shipped to a consumer. A shipping point price is computed as follows: (a) For Shipping Points located within a basing point.—The price established for the basing point in which the shipping point is located, is determined. Then deduct from this the actual costs involved in transporting scrap from the shipping point to the consumer's plant within the basing point which is nearest, in terms of transportation costs, to the shipping point; (b) For shipping points located outside a basing point.—The price established for the nearest basing point, in terms of transportation charges, to the shipping point is determined. Deduct from this the lowest established charge for transporting scrap from the shipping point to such basing point. *Exceptions:* (1) The shipping point price at any shipping point in New England, of those grades of scrap for which no prices are listed above shall be the Johnstown basing point price, minus the all-rail transportation costs from

the New England shipping point to Johnstown; (2) Shipping point prices for New York City, Brooklyn, New York, and New Jersey shall be computed from the Bethlehem, Pa., basing point.

GULF PORT PRICES: Scrap shipped from Tampa, Pensacola, Gulfport, Mobile, New Orleans, Lake Charles, Port Arthur, Beaumont, Galveston, Texas City, Houston and Corpus Christi, has a maximum shipping point price not exceeding \$14 a gross ton, f.o.b. cars, for No. 1 heavy melting steel. For other grades, the differentials established for Birmingham apply.

REMOTE SCRAP: Material located beyond the zone from which the railroad freight rate to Pittsburgh is \$11.20 is called remote scrap. Consumers desiring to purchase such scrap, but unable to do so without exceeding the ceiling prices, may make application to OPACS for permission to absorb the excess freight charges.

UNPREPARED SCRAP: Regardless of source, maximum price of unprepared scrap is \$2.50 less than maximum for corresponding grade of prepared scrap.

BILLET AND BLOOM CROPS: Where such material originates in the Pittsburgh basing point, it may be sold delivered to a consumer within or without the Pittsburgh point at the price given in Schedule 'A, plus not more than \$2.50 in transportation charges. Lowest established transportation charges will govern.

Non-Ferrous Scrap

(Dealers buying prices, cents per lb.)

	New York	Philadelphia	Pittsburgh	Cleveland	Detroit	Chicago
No. 1 heavy copper	*10.00	*10.00	*10.00	*10.00	*10.00	*10.00
Light copper	* 8.00	* 8.00	* 8.00	* 8.00	* 8.00	* 8.00
Heavy yellow brass	6.50-6.75	*6.25	7.50-8.00	5.75-6.25	7.00-7.25	7.00-7.50
Light brass	5.75-6.00	*5.50	7.25-7.50	6.00-6.50	6.50-6.75	7.00-7.25
No. 1 comp. turnings	9.50-9.75	*7.75	*9.50-9.75	8.50-9.00	9.00-9.25	9.00-9.25
New yellow brass clips	8.00-8.25	8.50-9.00	7.75-8.00	8.00-8.50	7.50-8.00	7.75-8.25
Soft lead	5.25-5.50	5.00-5.25	4.75-5.00	4.75-5.00	5.00-5.25	4.75-5.00
Old zinc	4.00-4.25	4.25	4.25-4.50	4.00-4.25	4.50-4.75	4.50-5.00
Cast forged aluminum	*11.00	*11.00	*11.00	*11.00	*11.00	*11.00
Old sheet aluminum	*11.00	*11.00	*11.00	*11.00	*11.00	*11.00
Solder joints	8.75-9.00	9.00	7.50-8.00	6.50-6.75	5.50-6.00	7.50-8.00
No. 1 pewter	36.00-37.00	35.00-36.00	31.00-32.00	32.50-34.00	37.50-38.50	32.00-34.00

* OPACS maximum for sale by dealer. ** Nominal.

PRICES

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes ²	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						\$5.32
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (¹⁰)			3.37¢
TERNES, M'FG.															
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
								(Coatesville and Claymont = 2.10¢)							
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢(¹¹)		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)					3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE ⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)				3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)				3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)				3.80¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS															
Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ Boxed. ¹¹ Ship plates only.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2 higher; f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling \$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

Per Gross Ton
3 in. to 12 in. \$52.00
12 in. to 18 in. 54.00
18 in. and over. 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.) Per Lb.
Pittsburgh, Chicago, Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Per Gross Ton
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem \$54.00

TOOL STEEL

(F.o.b. Pittsburgh)

Base per Lb.
High speed 67c.
High-carbon-chromium 43c.
Oil hardening 24c.
Special carbon 22c.
Extra carbon 18c.
Regular carbon 14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

PIG IRON

All prices set in bold face type are maxima established by OPACS on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston	\$25.50	\$25.00	\$26.50	\$26.00	.....	.....
Brooklyn	27.50	.....	.....	28.00	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	\$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....	.....
St. Louis	24.50	24.02	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	\$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	26.63	.....	27.13	26.63	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	27.50	.....	.....	.....	.....	.....
San Francisco	27.50	.....	.....	.....	.....	.....
Seattle	27.50	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace \$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

† Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	\$3.35	\$3.05	\$3.35	\$3.75	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$5.10
Sheets, cold rolled	.....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	.....	4.24	4.35	4.23	7.30
Sheets, galvanized	4.65	4.60	4.75	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	3.74	3.65	3.73	.....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.40	3.52	3.46	.....	3.61	3.83	3.54	.....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	*4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.10	7.55	7.31	7.60	7.67	7.35	7.50	.....	7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	9.35
Bars, ed. drn. SAE 2300	8.40	8.15	8.40	8.56	8.84	8.70	8.40	8.63	.....	8.77	8.84	8.63	11.35
Bars, ed. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.43. **Over 4 in. wide and over 1 in. thick, \$4.95.

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:

6 1/2 in., shorter and smaller	65 1/2
6 x 5/8 in., and shorter	63 1/2
6 in. by 3/4 to 1 in. and shorter	61
1 1/2 in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

1/2 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/8 to 1 1/2 in. inclusive	57
1 5/8 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	64	
1/2 in. and smaller	62	
1/2 in. through 1 in.	60	
9/16 to 1 in.	59	
1 1/8 in. through 1 1/2 in.	57	58
1 5/8 in. and larger	56	

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(1/2 in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
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Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
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Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
---------------------	--------

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15 1/2 gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes.

Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless	Lap Weld
	Cold	Hot
	Drawn	Hot Rolled
	\$	\$

2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2 1/2 in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3 1/2 in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

	Base
40,000 lb. or ft. over	5%
30,000 lb. or ft. to 39,999 lb. or ft.	10%
20,000 lb. or ft. to 29,999 lb. or ft.	20%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	45%
2,000 lb. or ft. to 4,999 lb. or ft.	65%
Under 2,000 lb. or ft.	

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe)

Base Price = \$200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron (Butt Weld)

1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Steel (Lap Weld)

2 in.	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2

Wrought Iron (Lap Weld)

2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron (Same as Above)

1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Steel (Lap, extra strong, plain ends)

2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

Wrought Iron (Same as above)

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

Per Net Ton

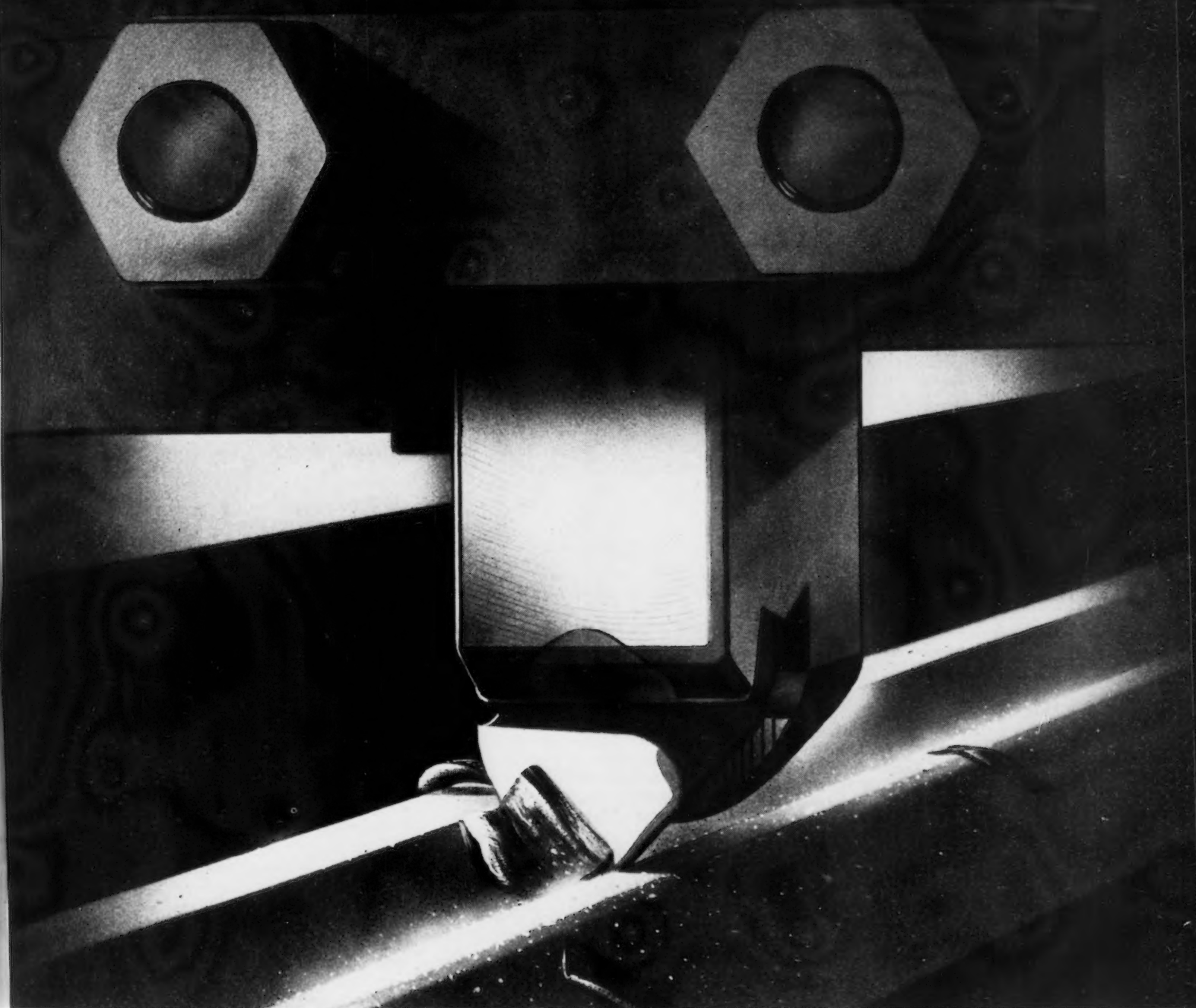
6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	4.90c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate del'd Cleveland	6.25c.
No. 4 indus., del'd Cleveland	5.75c.
No. 6 indus., del'd Cleveland	5.00c.

Molybdenum High Speed Steels combine performance with economy



No reduction in the cost of tools could be enough to overcome inferior performance. Fortunately, Molybdenum high speed steels, which cost less than the Tungsten types, combine lower purchase price with equal performance.

Users know that improved cutting properties, better

toughness and lower cost progressively bring about tool cost reduction.

It will pay you to call in your supplier for the analysis and heat treatment of the Molybdenum high speed steel that is most suitable for your cutting and cost requirements.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • CALCIUM MOLYBDATE

Climax Molybdenum Company
500 Fifth Avenue • New York City

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads)...\$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%...\$36.00
Domestic, 26 to 28%... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)...\$74.50*
50% (ton lots, packed)... 87.00*
75% (carload, lots, bulk)...135.00*
75% (ton lots, packed)...151.00*

Silvery Iron

(Per Gross Tons, base 6.00 to 6.50 Si)

F.O.B. Jackson, Ohio...\$29.50*
Buffalo...\$30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorous or over.

* Official OPACS price established June 24.

Bessemer Ferrosilicon*

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

*Prices published in issues previous to Sept. 4, 1941, have been revised to above basis.

Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon...11.00c.
2 carbon...17.50c.
1 carbon...18.50c.
0.10 carbon...20.50c.
0.06 carbon...21.00c.

Spot prices are 1/4 c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon...\$113.00*
2.50 carbon...118.00*
2 carbon...123.00*
1 carbon...133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload.... \$2.00

Ferrotungsten, 100 lb. and less \$2.25

Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots... \$2.25†

Ferrocobaltititanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton...\$142.50

Ferrocobaltititanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton...\$157.50

Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equalized with Rockdale, Tenn., gross ton.... \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equalized with Nashville, gross ton... \$75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace... 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace... 80c.

Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.

Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Washington, Pa. 80c.

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50... \$4.75
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50... 4.35

Foreign Ores*

(C.A.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, Indian, 44-48 Mn. .65c. to .66c.
African, Indian, 49-51 Mn. .67c. to .69c.

Brazilian, 46-48 Mn.65c.
Cuban, del'd, 51 Mn.79c. to 81c.

Per Short Ton Unit

Tungsten, Chinese Wolframite, duty paid, delivered....\$24 to \$26

Tungsten, domestic scheelite, at mine\$24.00

Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade).....Nom.

Rhodesian, 45\$32.00
Rhodesian, 48\$39.00-\$40.00

*Importations no longer readily available. Prices shown are nominal.

COKE

Furnace

Per Net Ton

Connellsville, prompt ...\$6.00 to \$6.25

Foundry

Connellsville, prompt ...\$6.75 to \$7.00
By-product, Chicago\$10.50
By-product, New England....\$13.75

By-product, Newark..\$12.40 to \$12.95

By-product, Philadelphia\$12.13

By-product, Cleveland\$12.30

By-product, Cincinnati\$11.75

By-product, Birmingham \$8.50

By-product, St. Louis.\$10.75 to \$11.00

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton\$40.00
Angle bars, 100 lb. 2.70

(F.o.b. Basing Points) Per Gross Ton

Light rails (from billets).....\$40.00
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes 3.00c.

Screw spikes 5.15c.

Tie plates, steel 2.15c.

Tie plates, Pacific Coast 2.30c.

Track bolts, heat treated, to

railroads 5.00c.

Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapqua, Colo., Birmingham and Pacific Coast ports: tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail....\$22.00 to \$23.00

Domestic, f.o.b. Ohio River landing barges 22.00 to 23.00

No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..22.00 to 23.00

Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal

Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines.... 31.00

As above, in bags, f.o.b. same mines 32.60

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick Per 1000

Super-duty brick, St. Louis...\$64.60

First quality, Pennsylvania, Maryland, Kentucky, Missouri

and Illinois 51.30

First quality, New Jersey.... 56.00

Second quality, Pennsylvania, Maryland, Kentucky, Missouri,

and Illinois 46.55

Second quality, New Jersey... 51.00

No. 1, Ohio 43.00

Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania\$51.30

Chicago District 58.90

Birmingham 51.30

Silica cement, net ton (Eastern) 9.00

Chrome Brick

Per Net Ton

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...\$54.00

Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and

Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and

Chester\$76.00

Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and

Chester in sacks\$44.00

Domestic, f.o.b. Chewelah, Wash.

(in bulk) 22.00

Engineered Production



One of the Reasons

Diagram at left shows one of many reasons for Sundstrand Automatic Stub Lathe speed . . . No cycle-control cams to make or mount, merely adjust dogs on convenient graduated disc. See details in Bulletin 391.

Pump Drive Shaft Propeller Shaft Sleeve Impeller Shaft Tailshaft

Automatic Stub Lathes Speed Production on Parts Like These

On WRIGHT Miscellaneous Shafts

Shown in panel above are four typical work-pieces from the miscellaneous shaft department of Wright Aeronautical Corporation, Paterson, N. J., where a wide variety of work is turned to high standards of accuracy and finish. Engineered Production and Sundstrand Automatic Stub Lathes increased output on these pieces an average of 56%, and give equally satisfactory service on a large number of other jobs.

The easy set-up and quick change-over of Sundstrand Automatic Lathes provide high production and economy on small-lot work. For example, Model 8 shown above does two sets of operations on pump shafts. Twenty to 25 minutes suffice for changing from one group of operations to the other. Setting up for new jobs is rapid because Sundstrand Automatic cycles are established quickly by adjusting dogs on a convenient graduated disc; large numbers of speeds, feeds and cycles are available for quick,

easy selection; Sundstrand standard tool blocks, and micrometer adjustments of tool slides, save time.

On mass production, Sundstrand Automatic Lathes have power, strength and rigidity to work high-speed cutting tools at maximum capacity in any metal; and stamina to keep on running steadily in such service, with minimum maintenance.

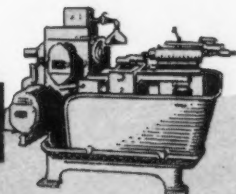
On all their work, Sundstrand Automatic Stub Lathes swing into high production quickly. Their operators need no special skill, little preliminary training; can work full shifts efficiently without excessive fatigue.

★ For high production on today's turning, take full advantage of your Sundstrand Automatic Stub Lathe qualities. For speed on next year's turning, order your Sundstrand Automatic Stub Lathes now. For best results any time on manufacturing turning or milling, use Sundstrand Engineered Production.

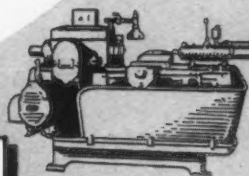
Sundstrand Machine Tool Co.

2539 Eleventh Street, Rockford, Illinois, U. S. A.

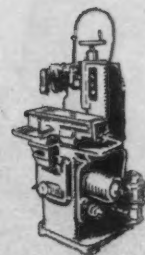
Model 8 Automatic Stub Lathe



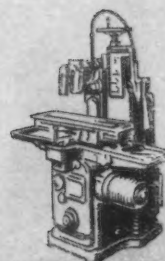
Model 10 Automatic Stub Lathe



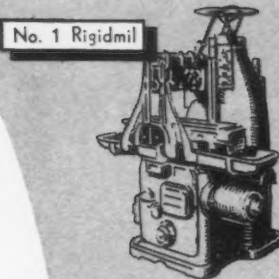
In their respective fields, Sundstrand machine tools are unexcelled for high production, accuracy, and lasting value. Write for complete details.



No. 00 Rigidmil



No. 0 Rigidmil

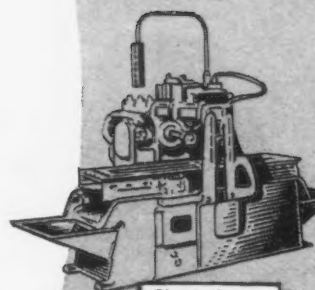


No. 1 Rigidmil

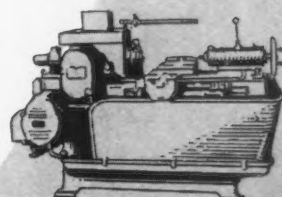
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Bulletin 391 shown above contains detailed descriptions and data on Automatic Stub Lathes. Write for your copy, today.



Fluid-Screw Rigidmil



Model 12 Automatic Stub Lathe



RIGIDMILS · STUB LATHES

Hydraulic Operating Equipment — Drilling and Centering Machines

SALES POSSIBILITIES

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **L. J. Barwood Mfg. Co., Inc.**, Williams Street, Everett, Mass., gaskets, washers and kindred products, has let general contract to James Sheppard, 225 Vine Street, for one-story addition, 50 x 165 ft. Cost close to \$60,000 with equipment. Hutchins & French, 11 Beacon Street, Boston, are architects.

Meisel Gear Co., an interest of Meisel Press Mfg. Co., 944 Dorchester Avenue, Boston, cut gears, printing machinery and parts, plans one-story factory for production of aircraft parts for government. Cost about \$1,682,500 with equipment. Fund in that amount will be secured through Defense Plant Corp., Washington.

Union Mfg. Co., Church Street, New Britain, Conn., overhead trolleys, hoists, etc., has let general contract to Eagle Construction Co., Bishop Avenue, Bridgeport, Conn., for one-story addition, 30 x 160 ft., for storage and distribution. Cost close to \$40,000 with equipment.

Bridgeport Hardware Mfg. Corp., 461 Iranistan Avenue, Bridgeport, Conn., plans one-story addition. Cost close to \$50,000 with equipment. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, is architect and engineer.

War Department, Washington, has let general contract to Caye Construction Co., Inc., 356 Fulton Street, Brooklyn, for air bases at Presque Isle and Houlton, Me., each to consist of hangars, repair shops, oil storage and distribution systems, warehouses and other structures. Cost \$3,080,000 and \$2,400,000 in order noted. Appropriations have been authorized.

Hanson-Whitney Machine Co., Bartholomew Avenue, Hartford, Conn., metal-shaping machinery and parts, has let general contract to Bartlett & Brainard Co., 103 Woodbine Street, for two-story addition. Cost over \$65,000 with equipment. J. T. Henderson, 750 Main Street, is engineer.

Remington Arms Co., Inc., Bridgeport, Conn., will begin work soon on new plant on 5000-acre tract, near Salt Lake City, Utah, for production of shells and other ammunition for War Department, to be known as Utah Ordnance Plant. Cost of buildings and equipment about \$18,500,000, and fund in that amount will be provided by government.

Linde Air Products Co., 30 East Forty-second Street, New York, has purchased about 100 acres near Kittanning, Pa., formerly occupied as Armstrong County Fairgrounds, for new plant, construction to begin in November. It will include power house, machine shop and other mechanical structures. Cost over \$3,000,000 with equipment.

F. & M. Schaefer Brewing Co., 430 Kent Avenue, Brooklyn, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for eight-story addition, 90 x 120 ft., for storage and distribution. Cost close to \$350,000 with equipment.

M. W. Kellogg Co., 225 Broadway, New York, oil refinery machinery, piping, etc., main plant foot of Danforth Avenue, Jersey City, N. J., has approved plans for new one-story branch works, 60 x 200 ft., at Texas City, Tex., for a pipe fabricating plant. Cost over \$85,000 with equipment.

Revere Copper & Brass, Inc., 230 Park Avenue, New York, has let general contract to James Stewart & Co., same address, for new plant at Baltimore for production of naval equipment for government, consisting of main one-story unit and smaller structures. Cost estimated at \$3,100,000, of which about \$1,700,000 will be used for purchase of equipment, remainder for site and buildings. Fund in gross amount will be furnished by Defense Plant Corp., Washington.

Novocol Chemical Mfg. Co., Inc., 2921-23 Atlantic Avenue, Brooklyn, chemical and drug specialties, is erecting multi-story addition, for which general contract recently was let

to I. H. Meyer, 590 Sterling Place. Cost close to \$180,000, of which over \$100,000 will be expended for equipment. William A. Lacerenza, 391 Fulton Street, is architect.

Great Lakes Carbon Corp., Pine Avenue and Fifty-seventh Street, Niagara Falls, N. Y., electrodes, electrode carbons, etc., has let general contract to Laur & Mack Contracting Co., 1400 College Avenue, for one-story addition, 70 x 200 ft. Cost over \$60,000 with equipment.

General Drop Forge Co., 1738 Elmwood Avenue, Buffalo, a division of Brown-Lipe-Chapin Co., Syracuse, N. Y., has begun an expansion program to increase production close to 75 per cent, including three one-story buildings for drop hammer department, heat-treating division and other departments. Installation will include three new gas-fired heating furnaces and accessories, 12 drop hammers, with capacity from 3500 to 6500 lb., and other equipment. Cost about \$1,250,000 with equipment.

Niagara Shipbuilding Corp., 36 Washington Street, Buffalo, recently organized, has let general contract to Siegfried Construction Co., 6 North Pearl Street, for one-story shops and other structures for shipbuilding and repair yard. Cost over \$400,000 with equipment.

Empire Electric Brake Co., 875 Broadway, Newark, N. J., brake equipment and parts, has leased one-story building at 118 South Fourteenth Street, about 12,000 sq. ft. of floor space, for expansion.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Sept. 15 for drills (Circular 407), portable trough conveyor (Circular 411).

Bendix Aviation Corp., Bendix, N. J., has let general contract to Austin Co., Cleveland, for one-story addition, 180 x 400 ft., for production of magnesium castings. Cost over \$450,000 with equipment. Main offices are at South Bend, Ind.

Quimby Pump Co., 340 Thomas Street, Newark, N. J., pumping machinery and parts, has let general contract to James F. Mitchell, Inc., 40 Clinton Street, for new one-story plant, about 25,000 sq. ft. of floor space, on 10-acre tract on Jersey Avenue, New Brunswick, N. J., recently acquired. Cost over \$85,000 with equipment.

Isolantite, Inc., 343 Cortlandt Street, Belleville, N. J., electrical insulators, etc., plans new one-story factory for production of radio equipment for government. Cost about \$972,700 with equipment. Fund in amount noted will be provided by Defense Plant Corp., Washington.

Wheelock, Lovejoy & Co., Inc., 332 Frelinghuysen Avenue, Newark, N. J., steel products, will take bids soon on general contract for new one-story storage and distributing plant, 100 x 200 ft., at Hillside, N. J. Cost over \$85,000 with equipment. Ganteaume & McMullen, 99 Chauncy Street, Boston, are engineers.

Charles Lennig & Co., Inc., 222 West Washington Square, Philadelphia, industrial and other chemicals, has let general contract to Frank V. Warren, Inc., Fifteenth and Locust Streets, Philadelphia, for three and four-story additions to plant at Bridesburg, each about 45 x 160 ft. Cost close to \$175,000 with equipment. Davis & Dunlap, 1717 Sansom Street, Philadelphia, are architects.

War Department, Washington, has let general contract to Brann & Stuart Co., Broad Street Station Building, Philadelphia, for general storage depot at Marietta, Pa., comprising six main one and multi-story storage and distribution buildings and six miscellaneous structures, with shops and other facilities. Cost about \$5,044,000 with equipment.

Spicer Mfg. Corp., Pottstown, Pa., universal joints, etc., will equip one-story addition, 100 x 220 ft., now under way, for expansion in metal tubing division. Company also will convert part of present works for production of heavy joints and couplings for army trucks, tanks and other heavy-duty automotive equip-

ment. Entire project will cost close to \$250,000 with machinery. Main offices are at Toledo, Ohio.

Westinghouse Electric & Mfg. Co., East Pittsburgh, plans expansion at branch plant at Sharon, Pa., used for electric transformer and allied equipment production, to include several one-story units for structural iron division, transformer tank shop and other departments, including laboratories. Cost close to \$1,750,000 with equipment. Company is arranging for additional financing to provide fund of about \$60,000,000, part to be used for further expansion in different parts of country and other capital expenditures.

Procurement Division, Treasury Department, Washington, asks bids until Sept. 15 for precision instruments and accessories required during period from Jan. 1 to Dec. 31, 1942, including torsion balances, current meters, wind-vane bearings, cranes for current meters, current meter weight hangers, weight-hanger pins, water-stage recorders, sounding reels, etc. (Class 18).

Bethlehem Steel Co., Shipbuilding Division, Sparrows Point, Baltimore, plans two new shipways, outfitting dock, shops and other structures, for construction of vessels for U. S. Maritime Commission, which will provide fund for work. Cost about \$2,000,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 16 for eight motor-driven bench grinders (Schedule 8506), 71 electric floor polishing and scrubbing machines (Schedules 8494) for Eastern and Western navy yards; one diesel engine tractor, current model, crawler-type, power take-off, with 21-ft. boom, mounted crane, complete (Schedule 8497) for Western Navy Yard; until Sept. 19 for electric cable (Schedule LL-900-6070), for Philadelphia Navy Yard.

United Illuminating Co., New Haven, Conn., has preliminary plans for power plant addition to cost \$1,000,000 with equipment. Westcott & Mapes, Inc., 139 Orange St., New Haven, architect.

The South

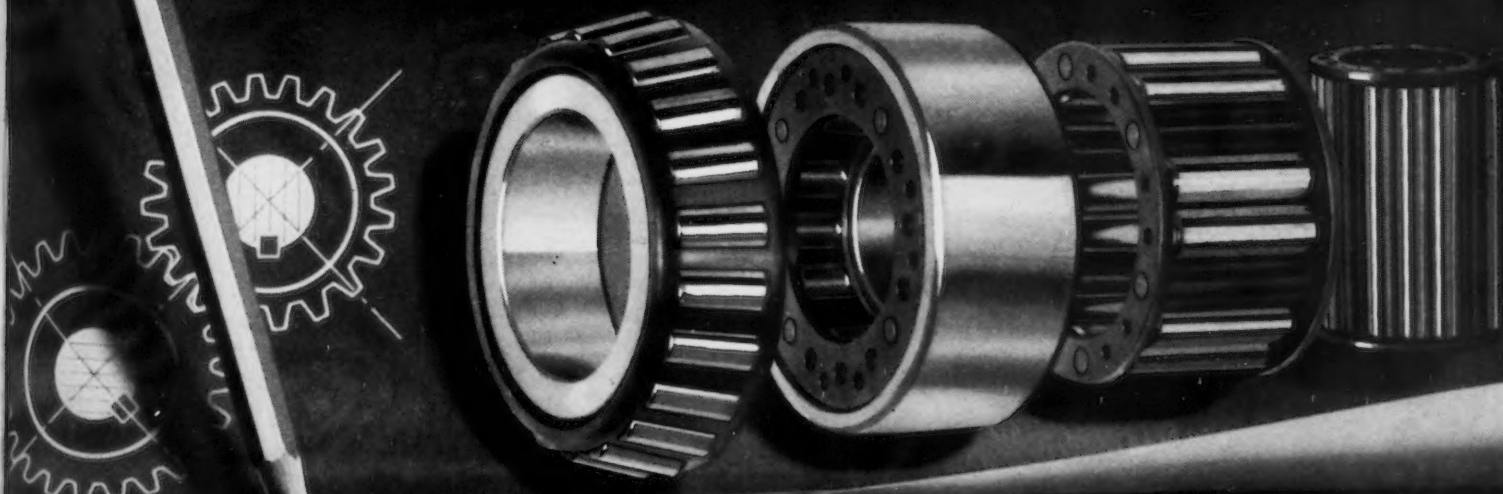
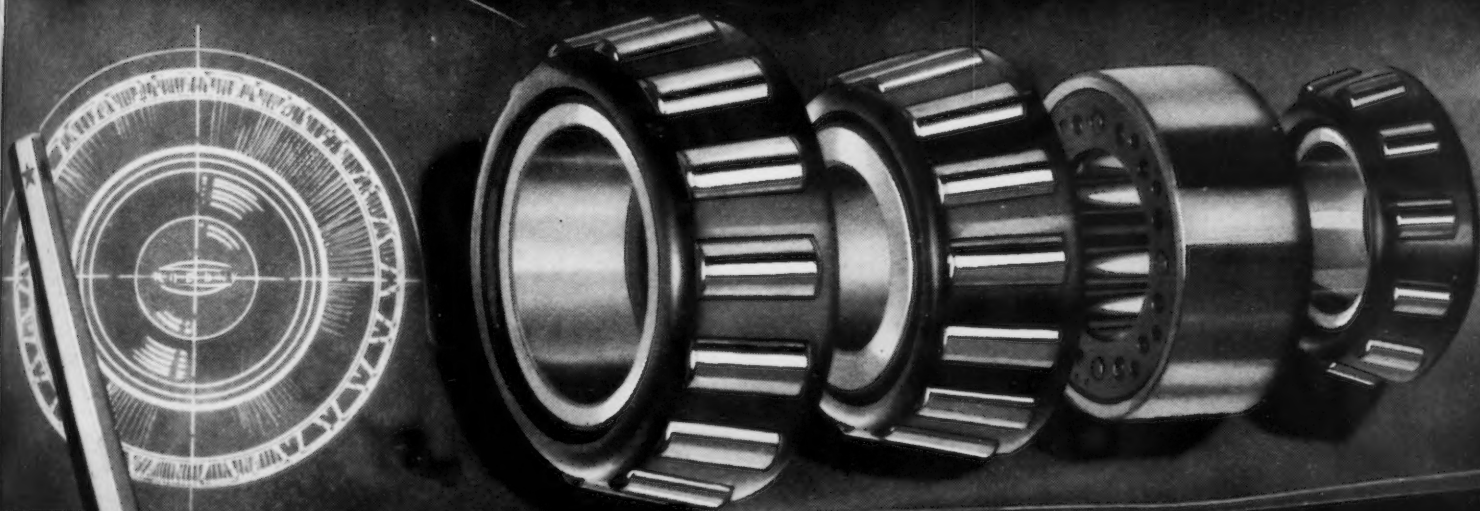
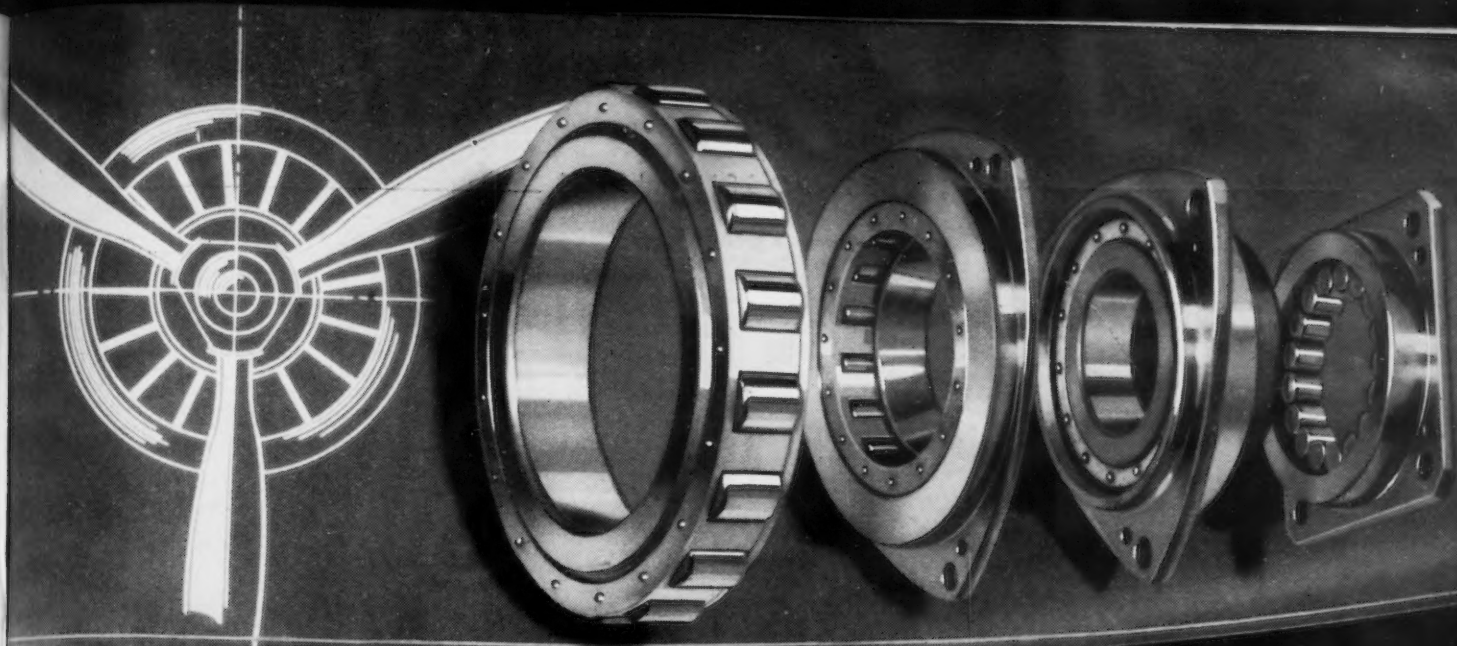
• **War Department**, Washington, has awarded contract to Stone & Webster Engineering Corp., 49 Federal Street, Boston, for design and construction, and purchase of equipment for new plant near Chattanooga, Tenn., for production of TNT. Plant will be known as Volunteer Ordnance Works and will include mechanical shops, power house, administration building, storage and distribution units, and other structures. It will be operated by Hercules Powder Co., Wilmington, Del. Cost about \$34,245,732 for land, buildings and equipment, fund in that amount to be provided by Defense Plant Corp., Washington.

Southeast Pipe Line Co., Forsyth Building; Pure Oil Co., 140 Spring Street, S. W.; and Gulf Oil Corp., Hurt Building, all Atlanta, Ga., plan joint construction of bulk oil terminal on Bolton Road, including one-story buildings, steel tank storage units, pipe line connections, pumping station and other facilities. Cost close to \$100,000 with equipment.

Tampa Shipbuilding Co., Inc., Tampa, Fla., is continuing expansion and improvements in shipyard, and will erect new shipway, with extensions in two of three present ways; also will build new outfitting dock, several one-story shops and other structures. Fund of about \$2,255,000 has been arranged for project through RFC.

Board of Education, Durham, N. C., plans new one and two-story vocational school at Duke Street and Minerva Avenue. Cost close to \$200,000 with equipment. R. R. Markley, Durham, is architect.

Falls Spring & Wire Co., 8635 Conant Street, Detroit, steel springs, wire products, etc., has taken over plant of Compress Buckle Co.,



Serving

BOWER
ROLLER BEARING CO.
Detroit, Michigan

AIRCRAFT * AUTOMOTIVE * INDUSTRIAL

Attalla, Ala., and will improve for production of shells for government.

Joy Mfg. Co., Buffalo Street, Franklin, Pa., mechanical-handling equipment, parts, etc., has approved plans for one-story branch plant, 40 x 100 ft., in Fairmont, W. Va., for repair, maintenance and parts. Company is considering large works for general production at same location later.

War Department, Washington, has selected site of about 1100 acres near Waco, Tex., for new basic Air Corp flying school, to include two hangars, machine repair shop, general utility building, parachute building, paint and dope shop, paint and oil storage building, training school building, control tower, four warehouses, gasoline fueling system, oil and gasoline storage and distributing units, and other structures. Fund of about \$4,363,000 is being arranged for entire project.

Humble Oil & Refining Co., Humble Building, Houston, Tex., has approved plans for expansion in gasoline division at oil refinery at Baytown, Tex., including equipment for increased production of high-test gasoline. Cost over \$225,000 with machinery.

Central States

● **Upson-Walton Co.**, 740 Superior Avenue, Cleveland, wire rope and cable, clamps, tackle blocks, etc., has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for one-story addition, 30 x 120 ft., for expansion in forge shop. Cost over \$50,000 with equipment. Bonfield & Cumming, 1900 Euclid Avenue, are architects.

Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio, plans one-story addition, about 25,000 sq. ft. of floor space, to recently completed local plant, where company has removed from Wilmerding, Pa., to concentrate production at first noted location. Cost over \$135,000 with equipment. Company is a joint subsidiary of Bendix Aviation Corp., South Bend, Ind., and Westinghouse Air Brake Co., Wilmerding.

Toledo Edison Co., Edison Building, Toledo, Ohio, plans expansion in steam-electric generating station, including new 50,000-kw. turbine-generator unit, high-pressure boiler and auxiliary equipment. Cost over \$5,000,000, including line extensions, power substations and other facilities.

National Acme Co., East 131st Street and Coit Road, Cleveland, automatic screw machines and screw machine products, has let general contract to Cleveland Construction Co., 3866 Carnegie Avenue, for two-story addition, 80 x 500 ft., for production of machine tools for government. Cost about \$300,000 exclusive of equipment, cost to be defrayed by company; equipment installation is estimated at \$488,000, fund in that amount to be furnished by Defense Plant Corp., Washington. George S. Rider Co., Terminal Tower Building, is architect.

United Aircraft Products, Inc., Dayton, Ohio, aircraft precision parts and accessories, has approved plans for new one-story plant, about 20,000 sq. ft. of floor space, on site adjoining local Wright Field, to be built with two temporary walls to provide for early expansion. Cost over \$125,000 with equipment.

Webber Gage Co., 2517 Vestry Avenue, Cleveland, is erecting one-story addition, 40 x 100 ft., for which general contract recently was let to George Warren, 1734 West Twenty-fourth Street. Cost close to \$45,000 with equipment. Jeavons Spahn & Associates, 12417 Cedar Road, are architects.

Romec Pump Co., Elyria, Ohio, rotary pumping machinery and parts, plans one-story plant for production of aircraft parts for government. Cost estimated at \$296,800, of which about \$207,600 will be used for purchase of equipment. Appropriation in amount noted will be furnished by Defense Plant Corp., Washington.

Zollner Machine Works, Inc., Fort Wayne, Ind., steel pistons and other iron and steel products, plans new one-story plant to double, approximately, present capacity. Cost over \$250,000 with equipment.

Whitefield Aircraft Corp., 315 North Seventh Street, St. Louis, has let general contract to Charles Kist, 2301-A South Kingshighway, for one-story hangar, 60 x 100 ft., with shop facilities, at airport on Highway 61, Jefferson County. Cost about \$40,000 with equipment. Bert Leur, 1155 Big Bend Boulevard, Richmond Heights, is architect.

Continental Baking Co., 630 Fifth Avenue, New York, has let general contract to James Stewart & Co., Inc., 230 Park Avenue, for new grain elevator at Iowa and Division Streets, Kansas City, Kan., 55 x 226 ft., and 85 ft. high. Cost over \$100,000 with elevating, conveying and other mechanical equipment, bins, etc.

Federated Metals Division, American Smelting & Refining Co., 4041 Park Avenue, St. Louis, has let general contract to Alberici Construction Co., Boatmen's Bank Building, for one-story addition, 82 x 120 ft., for storage and distribution. Cost over \$50,000 with equipment. Murphy & Wischmeyer, 911 Locust Street, are architects; Neal J. Campbell, last noted address, is engineer.

Continental Aviation & Engineering Corp., 12801 East Jefferson Avenue, Detroit, subsidiary of Continental Motors Corp., same address, plans new one-story plant at Muskegon, Mich., for production of aircraft engines for government. This is part of recently announced expansion of company, for which an appropriation of about \$5,000,000 will be secured through Defense Plant Corp., Washington, for buildings and equipment.

Upjohn Co., Kalamazoo, Mich., chemicals and drugs, has let general contract to Miller-Davis Co., Inc., Kalamazoo, for one-story addition, about 150 x 275 ft., part to be used for general production and remainder for storage and distribution. Cost close to \$90,000 with equipment.

Ramsey Accessories Mfg. Corp., 2639 Forest Park Boulevard, St. Louis, automobile parts and accessories, has taken over plant and property of National Piston Ring Co., Fruitport, Mich., and will continue operations as a branch plant.

Nash-Kelvinator Corp., 14250 Plymouth Street, Detroit, electric refrigerators, air-conditioning equipment, etc., has plans by Bowd & Munson, Wilson Building, Lansing, Mich., architects, for new plant at Lansing for production of airplane propellers for government. It is proposed to take over an existing plant and make extensions. Fund of about \$8,433,800 will be provided by Defense Plant Corp., Washington, for project.

Federal Mogul Corp., 11031 Shoemaker Road, Detroit, bearings, bushings, castings, etc., is erecting one-story foundry at Greenville, Mich., for which general contract recently was let to Earl H. Beckering Co., Grand Rapids, Mich. Cost over \$60,000 with equipment. Robinson, Campau & Crowe, Grand Rapids, are architects.

Borg & Beck Division, Borg-Warner Corp., 6558 South Menard Avenue, Chicago, automobile clutches and kindred products, has let general contract to Enjay Construction Co., 160 North LaSalle Street, for one and two-story addition, 201 x 233 ft., with office section, 28 x 201 ft. Cost over \$150,000 with equipment. John C. Van Balen, last noted address, is architect.

Victor Chemical Co., Chicago Heights, Ill., is erecting three-story addition, 60 x 120 ft., for which general contract recently was let to J. W. Snyder Co., 307 North Michigan Avenue. Cost over \$100,000 with equipment.

Pelton Steel Castings Co., 148 West Dewey Place, Milwaukee, has let general contract to R. G. Riesen, 2778 South Linebarger Terrace, for one-story addition, 60 x 134 ft., for expansion in foundry. Cost close to \$50,000 with equipment. William F. Eichfeld, 2538 North Thirtieth Street, is engineer.

Four-Wheel Drive Auto Co., Clintonville, Wis., automobile equipment, special tools, etc., will soon begin superstructure for one-story addition, 100 x 120 ft., for an assembling department. Cost close to \$60,000 with equipment. Traveling crane and other mechanical-handling equipment will be installed.

Seeger Refrigerator Co., 850 Arcade Street, St. Paul, Minn., refrigerators and parts, will begin erection soon for one-story addition, for which general contract recently was let to George J. Grant Construction Co., 893 Como Avenue. Cost close to \$100,000 with equipment. Grover W. Diamond, Builders' Exchange Building, Minneapolis, is architect.

Western Electric Co., Cicero and Cermak Roads, Chicago, has let general contract to Austin Co., Cleveland, for one-story addition for storage and distribution. Cost over \$85,000 with equipment.

Jewel Food Stores, Inc., 3617 South Ashland Avenue, Chicago, has let general contract to Dahl-Stedman Co., 11 South LaSalle Street, for one-story bulk storage and distributing building, 300 x 500 ft., near Kedzie Avenue and Fifty-first Street. Cost about \$450,000 with mechanical-handling, loading and other equipment. Holabird & Root, 333 North Michigan Avenue, are architects.

Western States

● **Wire Rope Mfg. & Equipment Co.**, 322 First Avenue South, Seattle, has let general contract to Gustav Olson, 7012 Seventeenth Avenue, N. W., for new one-story plant, 50 x 132 ft. Cost close to \$50,000 with equipment. Young & Richardson, Central Building, are architects.

Vega Airplane Co., 2555 North Hollywood Way, Burbank, Cal., aircraft and parts, will carry out further expansion in addition to that recently noted, to include unit for production of airplane parts for government. Fund of about \$1,822,700 is being secured through Defense Plant Corp., Washington, for buildings and equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 16 for one drill grinder (Schedule 8522), two shapers (Schedule 8498), tool and cutter grinder (Schedule 8510), all motor-driven, for San Pedro Navy Yard; I-beam clamps, flat wall mounting clamps, contact nuts, copper bus bars, tee connectors, welders' boxes, conduit fittings, etc. (Schedule 8519), 63,150 ft. of stranded copper cable, 2500 ft. of single-conductor wire (Schedule 8520), about 2200 ft. of zinc-coated rigid steel conduit (Schedule 8521) for Puget Sound Navy Yard; one two-ton overhead traveling bridge crane, push-button, floor-controlled; one one-ton similar crane (Schedule 8499) for Keyport, Wash., yard.

Rainier Brewing Co., 1550 Bryant Street, San Francisco, has let general contract to Engineers, Ltd., 225 Bush Street, for one-story addition for storage and distribution. Cost close to \$60,000 with equipment. Kaj Theill, 580 Market Street, is engineer.

Board of Education, Glendale, Cal., has asked bids on general contract for one-story technology shop building, 50 x 200 ft., at junior high school, 1500 North Verdugo Road. Cost over \$80,000 with equipment. George Lindsey, 5310 Monte Vista Street, Los Angeles, is architect; George W. Miller, Security Building, Glendale, is engineer.

Markey Machinery Co., 85 West Horton Street, Seattle, machinery and parts, has let general contract to Atherton Construction Co., Terminal Sales Building, for new plant at 7266 Eighth Avenue South, consisting of two one-story units. Cost close to \$45,000 with equipment.

Canada

● **DeHavilland Aircraft Co. of Canada, Ltd.**, Sheppard Avenue, North York Township, Toronto, has let general contract to A. W. Robertson, Ltd., 57 Bloor Street West, for several one-story additions to plant No. 2, for expansion in parts production and assembling divisions. Cost close to \$950,000 with machinery.

Morton Engineering & Dry Dock Co., Ltd., Louise Embankment, Quebec, plans one-story addition, about 60 x 160 ft., for a machine shop. Cost close to \$135,000 with equipment.